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ABSTRACTS OF CURRENT LITERATURE

SURGERY OF THE HEAD AND NECK

EYE

Ridley, H.: Ocular Manifestations of Malnutrition in Released Prisoners of War from Thailand. *Brit. J. Ophth.*, 1945, 29: 613.

The author reports on the unique opportunity offered by the examination of 500 released allied prisoners of war, and internees from Thailand who believed that their vision had deteriorated during their captivity. Food had been deficient in quantity, and especially lacking in proteins, fats, and vitamins. Meals had consisted mostly of polished rice, vegetable stew, a small quantity of meat, and tea. For a period of 6 months the food had been reduced nearly to the starvation level, with only rice and salt for one period, and it was during this time that most of the visual symptoms occurred. Ninety of 100 patients were amblyopic.

In many cases the amblyopia had occurred during a single day; in others the onset was more gradual. Night blindness was uncommon. Campimetry revealed in 90 cases a small central scotoma not usually extending over 3 degrees from the fixation point, although in the severe cases it was much larger. Many patients showed normal fundi, but in others a temporal pallor of the disc was noted. Altogether there were 48 definite and 30 doubtful cases of optic atrophy.

Practically all of the released prisoners showed some degree of keratoconjunctival abnormality, usually an increased vascularity at the limbus with the formation of aneurysms, and vessels and opacity extending into the cornea for about 2 mm. There were 3 cases of interstitial keratitis with negative Kahn tests.

While there seems no doubt of the relationship of the visual disorders described to the nutritional deficiency, the author is inclined not to place the entire blame on a single vitamin deficiency, but rather on the general malnutrition of the prisoners. However, some of the changes described might well be secondary to deficiency in vitamins of the B group. There was noted a high incidence of arcus senilis in this relatively young age group, and this also suggests a derangement in fat metabolism.

Treatment in these cases included a full diet and supplemental vitamin therapy. The author plans to offer a later report showing the results which have been achieved. In the severe cases with marked optic atrophy, too much improvement is not to be expected. Visual acuity at the time of the original examination varied from 1/60 to a partial 6/6

WILLIAM A. MANN, M.D.

Sen, K., and Ghose, N.: Ocular Gnathostomiasis. *Brit. J. Ophth.*, 1945, 29: 618.

Few cases of parasites recovered from the eye have been reported. The author reports the first case of gnathostomiasis in the human eye. In fact, this infection is quite rare in the human being, and up to 1937 only 24 definite and 60 clinical cases had been reported, and these involved the stomach, lungs, kidneys, mastoid, and subcutaneous tissues.

The present instance occurred in a 26 year old Hindu who was admitted to the hospital for investigation of an orbital cellulitis with hemorrhages in the retina and vitreous of the left eye. He developed an iritis and after a considerable period of treatment a moving pigmented nodule was noted in the anterior chamber imbedded in the iris. Slit lamp examination revealed it to be a worm.

The parasite was removed after a retrobulbar injection to reduce the intraocular tension (which had been elevated). After a suitable incision with a thin Graefe knife the worm was removed *in toto* with a curette. Recovery was uneventful. Later examination showed the disc to be atrophic and the arteries thin and sheathed, and there was a pigmented scar below the macula. As this was not present on the first examination it was believed to be the point of entrance for the parasite. WILLIAM A. MANN, M.D.

Rosen, E.: Diabetic Needles. *Brit. J. Ophth.*, 1945, 29: 645.

The author points out that in diabetics, characteristic changes can be found in the lens in addition to the accepted ocular signs of diabetes such as rubeosis iridis, small globular hemorrhages at the macula, retinitis proliferans, retinitis circinata, sudden onset of hyperopia, and lipemia retinalis.

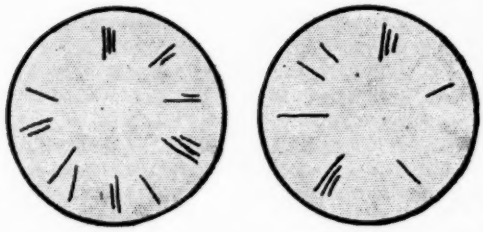

Fig. 1. In this case the patient had no knowledge of having diabetes. The vision was 20/100 in each eye, and was correctible to 20/30 in each eye. Examination of the lens revealed the presence of diabetic needles. The fundus showed no evidence of diabetes. Urine examination disclosed the presence of sugar.

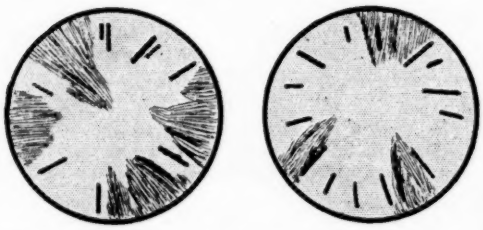

Fig. 2. In this case the patient was 60 years of age. She had had diabetes for 22 years. Diabetic retinitis was present especially at the macula. In the periphery of each lens there were several diabetic needles superimposed upon the incipient cortical opacities.

He describes a lenticular sign in diabetics which when present is considered specific for diabetes. It is known as the "diabetic needle" or "roman numeral" sign—a linear black spoke in the periphery of the lens which is no thicker centrally than it is peripherally. In all cases the spokes were never thicker at the periphery of the lens than at its center, and they were seen best with the indirect ophthalmoscope or the retinoscope.

A series of 19 cases which presented these so-called "diabetic needles" is reported. Many of the cases also presented nuclear and cortical lenticular opacities.

JOSHUA ZUCKERMAN, M.D.

Smelser, G. K., and Ozanics, V.: The Effect of Local Anesthetics on Cell Division and Migration following Thermal Burns of the Cornea. *Arch. Ophth.*, Chic., 1945, 34: 271.

Smelser and Ozanics discuss the effect of local anesthetics on cell division and migration following thermal burns of the cornea.

They conclude:

1. Topical application of most anesthetics inhibits mitosis in the intact corneal epithelium if they are of a sufficient concentration to produce anesthesia.

2. The inhibition of cell division varies with the drug, the method of administration, and the frequency of application.

3. If anesthetics are applied locally to corneal burns the migration of epithelial cells over the injured area is markedly inhibited.

4. Most anesthetics also inhibit cell division in the regenerating epithelium.

5. Some drugs inhibit mitosis but do not retard cell migration.

6. Nupercaine and phenacaine ointments produce prolonged surface anesthesia, but do not impair mitosis in normal epithelium nor retard cell division or migration in regenerating epithelium.

7. Unbuffered aqueous solutions inhibit healing more than ointments of the same or of greater strength.

JOSHUA ZUCKERMAN, M.D.

Roper, K. L.: Senile Hyaline Scleral Plaques. *Arch. Ophth.*, Chic., 1945, 34: 283.

The author reviews the literature on a clinical asymptomatic entity he calls "senile hyaline scleral plaques," and reports 5 cases of his own. These plaques, which are rectangular, round, or oval and of a slate gray color, are symmetrically situated about 3 mm. from the limbus and about 2 mm. anterior to the insertions of the lateral or, more frequently, of the medial rectus muscles. The patches are slightly depressed and transilluminate clearly. Patients are generally unaware of the presence of the condition.

Advanced age associated with dehydration and progressive sclerosis is considered the most predisposing factor in the disease. It probably is due to a local nutritional disturbance resulting from arteriosclerosis and the stress and strain on the sclera. For this reason the term "senile hyaline scleral plaques," is preferred to more confusing names.

As far as a differential diagnosis is concerned, the author points out that scleromalacia perforans is primarily necrotic in origin, whereas scleral plaques are degenerative; brawny scleritis is an invasion by granulation tissue and plasma cells; and sarcoma is deeply pigmented, whereas scleral plaques are gray and nonpigmented.

JOSHUA ZUCKERMAN, M.D.

EAR

Hall, I. S.: Fenestration of the Labyrinth. *J. Lar. Otol.*, Lond., 1945, 60: 200.

The author reports his experiences with the fenestration operation for deafness due to otosclerosis in 71 cases during the past 6 years. The method of operation is essentially the one stage procedure developed by Lempert from the multiple stage procedure of Sourdille. A pedicle flap consisting of the thin skin of the bony posterior and superior walls of the external canal attached to the drum membrane is preserved to cover the fenestrum. The author prefers the postauricular mastoid incision to the endaural approach. The annulus tympanicus is re-

moved in the upper portion, and the incus and head of the malleus is resected, using care to preserve the skin flap attached to the drum in an undamaged state. A dissecting microscope is used while working on the labyrinth capsule. General anesthesia, consisting of heavy premedication and light ether, is favored since immobility of the patient is desirable when using the microscope. The fenestrum is made over what is considered to be the ampulla of the horizontal canal. Electrically driven burrs of various types are used. Important points in the making of the fenestrum are considered to be the use of irrigation to remove bone dust and the care with which the endosteum and small bone chips are removed by means of small scrapers and needles. Paraffin gauze is used to hold the skin flap in position and is removed after from 5 to 7 days. Skin grafting of the cavity is sometimes carried out at the time of the first dressing, by either the Thiersch or pinch method.

The results have shown a steady improvement over the 6 year period, and approximately 55 per cent of operations during the past year are considered to be successful. Revision of a fenestrum which has closed is a more delicate procedure than the primary operation and entails greater risk to the membranous labyrinth. The opinion is advanced that even in cases in which the fenestrum has closed, subsequent deterioration of hearing appears to be arrested, as has been shown by comparison with the opposite ear. Failure to orient sounds has been noted on several occasions following the fenestration operation, but vertigo has not been troublesome after the first weeks.

The causes of failure which are commonly met are closure of the fenestra, advancing age, and the presence of nerve deafness, infection, and technical failure. JOHN R. LINDSAY, M.D.

NOSE AND SINUSES

Bernfeld, K.: The Genesis of Typical and Atypical Cysts of the Nasal Floor. *J. Lar. Otol.*, Lond., 1945, 60: 145.

The term "cyst of the nasal floor" is applied by the author to prominences of the vestibulum of the nose, situated either just in front of, or behind, the apertura pyriformis, extending to the lateral corner of the nasal floor, and containing a liquid matter. They are rather rarely encountered. As a result of the author's experience it appears that small, soft cushions of the mucous membrane, with very little or no contents, are considerably more common. If, in the routine examination, rhinologists did not omit the lowest, most laterally situated corner of the nasal cavity, formations of this type would not be compressed, nor escape attention. The author believes it may be helpful to clarify the genesis of these peculiar cystic formations.

The distinction between "typical" and "atypical" cysts has been made from a clinical and not from a genetical viewpoint.

The diagnosis offers no special difficulty if the cyst is found at its typical site within the soft parts. Palpation from underneath the upper lip with simultaneous probing will at once clarify the nature of the tumor found there. Aspiration yields a translucent, yellowish fluid in which usually no cholesterol is contained.

The most important cyst in differential diagnosis is the radicular dental cyst, excluded by radiography.

As long as the typical or atypical cysts are small and cause no symptoms, any kind of treatment is superfluous. If, however, the growth of the cyst, suppuration, or some other condition makes its removal imperative, the procedure should be a radical one by peroral approach underneath the upper lip. The operation should be followed by cauterization which ensures a firm scar.

The total number of cases presenting typical nasal floor cysts was 3, that of atypical ones, 21; 4 of the patients were children (3 girls of 8, 11, and 12 years, respectively, and 1 a boy of 7); 17 were adults between the ages of 28 and 38 years.

The cysts occurred unilaterally in 13 cases (in 8 cases on the right) and bilaterally in 8.

JOHN F. DELPH, M.D.

Beck, A. L.: Abscess of the Nasal Septum Complicating Acute Ethmoiditis. *Arch. Otolar.*, Chic., 1945, 42: 275.

Abscess of the nasal septum may result from infection anywhere in the neighboring tissues, but such abscesses occur most frequently after accidental or surgical trauma. The pus may be found on one side or on both sides of the cartilaginous and bony framework. The author reports 2 cases, in both of which incision on one side only was adequate.

The cartilage apparently disintegrates, for fragmentation or sequestration of cartilage or bone is not always recognized at the time of, and following, surgical drainage. Abscess of the septum following trauma is preceded by the formation of a hematoma between the mucoperichondrium and the cartilage. Abscess following sinusitis probably is not preceded by the formation of a hematoma. There was no hematoma in either of the cases reported.

Abscess resulting from injuries accompanied by simple and compound fractures of the nasal bones must be a rare occurrence, since the author has not observed it over a period of many years. Observations of persons injured in automobile accidents as they appear in the accident room of the hospital serve as the basis for this statement.

Abscess of the septum has been reported following endonasal antrostomy performed through the inferior meatus. This may possibly result from instrumental trauma to the lower part of the septum in the performance of the operation.

The one unfailing symptom of septal abscess is complete, usually bilateral, obstruction of nasal breathing. Tenderness, pain in the nasal and orbital regions, and swelling of the nose are also present. The mucosa covering the septum does not shrink when epinephrine hydrochloride and other vasoconstrictors are applied. JOHN F. DELPH, M.D.

MOUTH

Pignatelli, G.: Solitary Neurinoma of the Tongue (Neurinoma solitario della lingua). *Gior. ital. chir.*, 1945, 1: 24.

The author describes a solitary neurinoma of the tongue in a patient aged 26. The condition had been in existence for 8 months. The tongue had a normal color, was moist, and showed no impairment of its movements. A tumefaction was palpable at the tip of the tongue; this was elastic, of rather hard consistency, and was not sharply circumscribed. Pain could be provoked only by strong pressure. The lymph glands were not involved and the Wassermann, Sachs, and Meinicke reactions were negative.

Various conditions had to be considered in the differential diagnosis. Cavernous angioma is easily recognizable by its color and compressibility. A circumscribed lymphangioma is relatively hard and is usually found on the lower surface of the tongue; lingual papillae are usually enlarged. Carcinoma or sarcoma of the tongue has a rapid evolution. Fibroma usually has a submucous location but it may be pedunculated. Lipoma, as a rule, resembles a fibroma clinically but its consistency is softer. Syphilis of the tongue in the form of a gumma involves the surface of the tongue and shows a tendency toward ulceration. The blood examination confirms the diagnosis. A tuberculous granuloma as a primary manifestation of tuberculosis is very rare; as a rule, signs of pulmonary or intestinal tuberculosis are present. Actinomycosis of the tongue shows a rapid evolution and the hard nodules gradually become soft and lead to the formation of fistulas. Hydatid cysts of the tongue are extremely rare and reach a considerable size. Glandular cysts usually have a marginal location. Congenital cysts are found at the base of the tongue and in the region of the lingual V.

The author removed the tumor under local anesthesia. Its weight was 30 gm. The histological diagnosis was neurinoma. Such tumors originate from Schwann's sheath. Several varieties of the tumor, such as neurofibroma or neurinoma sarcomatodes, and neurocytoma, have been described. Parallel fibrillae cemented together with a protoplasmatic substance and nuclei located at various heights are characteristic for neurinoma. The location of the neurinoma at the tip of the tongue is very rare. No anatomic connection between the tumor and a nerve trunk could be established. Many workers consider the tumors to be hamartomas or aberrant formations of neuroblastic origin.

JOSEPH K. NARAT, M.D.

NECK

Shirer, J. W., and Cohen, M.: The Effects of Thiouracil on the Thyroid Gland. *Ann. Int. M.*, 1945, 23: 790.

Six hyperthyroid patients were treated with thiouracil for varying periods to prepare them for thyroidectomy. These periods were relatively short, from 9 days to a month, except in 1 instance in which the thiouracil medication was continued for 7 months. Two of these patients had previously been prepared with iodine and subjected to a lobectomy, and the histological picture at the first operation had shown the more or less typical iodine involutional effects.

At the second operation the remaining lobe in 1 of these patients exhibited the typical hyperplastic thiouracil picture, i.e., small empty acini and tall pale granular cells with large pale central nuclei; while in the other case the histological picture resembled a simple colloid goiter, unaffected by the thiouracil except in isolated hyperplastic patches where the typical thiouracil effect was evident. In nearly every instance the gland or lobe appeared friable and vascular upon removal, no matter what the amount or character of the preparation, and the postoperative reaction was rather severe, even approaching that of the thyroid crisis. Nevertheless, in 1 patient, to whom no iodine had been administered and to whom thiouracil had been given for only 10 days preoperatively, the gland did not appear vascular or friable and the postoperative reaction was mild, and yet the microscopic picture revealed a typical thiouracil effect; in other words, it was not always possible to correlate the clinical and the pathological pictures in this series.

In the case of the patient who had taken thiouracil for 7 months preoperatively, no mention is made of gland friability and there was no postoperative reaction, the microscopic picture showing a patchy architecture with hyperplastic areas, which was more like an untreated Graves disease than a typical thiouracil effect. This was interspersed with lower darker celled acini and large masses of colloid, which gave the appearance that the gland was undergoing a colloid involutionary process.

Although it is admitted that thiouracil will control clinical hyperthyroidism in the patient who has undergone operation as well as in the patient who has not been subjected to it, the authors are of the opinion that iodine is still the drug of choice for preparing the thyrotoxic patient for operation. Their opinion is based upon the technical difficulties experienced by the surgeon because of the increased vascularity and friability of the gland which has been prepared with thiouracil, the frequent stormy postoperative course, and the fact that standards have not as yet been set up to determine when the patient under thiouracil medication is ready for operation.

Many excellent photomicrographic reproductions accompany the original article.

JOHN W. BRENNAN, M.D.

Bartels, E. C.: Thiobarbital in the Treatment of Hyperthyroidism. *J. Am. M. Ass.*, 1945, 129: 932.

Astwood has reported that diethyl thiobarbituric acid (thiobarbital) has antithyroid activity similar

to that of thiouracil. Experiments on rats showed that thiobarbital in small doses was somewhat more effective in inhibiting thyroid function and perhaps less toxic than thiouracil. However, animals which received thiobarbital in larger doses were found to have fatty infiltration of the liver.

The opportune moment for the author's initial trial of thiobarbital came in October, 1944, when a patient receiving thiouracil developed a fever reaction which necessitated discontinuance of treatment but further antithyroid therapy was essential before thyroidectomy. This first experience with thiobarbital revealed that this drug has unquestionable antithyroid action in human beings, and that sensitivity to thiouracil does not preclude its use.

Thiobarbital has now been used at the Lahey Clinic in the treatment of 28 patients with hyperthyroidism, and definite and satisfactory antithyroid response was obtained in all.

Of 9 patients in whom toxic reactions to thiouracil developed, 7 tolerated thiobarbital, which produced complete relief of the hyperthyroidism.

Eight of the 28 patients receiving thiobarbital, or 28 per cent, developed toxic reactions to the drug. The depressive change in the white blood cells was the only serious reaction. Two patients developed agranulocytosis. There was no death due to the drug.

The time required to control hyperthyroidism with thiobarbital was found to be the same as that with thiouracil. The antithyroid effect of thiobarbital is apparently twelve times that of thiouracil, since 0.05 gm. of thiobarbital accomplished the same result that 0.6 gm. of thiouracil accomplished. Since no side effects were observed with the smaller dose (0.05 gm.), further studies with this dose seem justified to determine its clinical effectiveness.

The anesthesia and postoperative course of patients treated with thiobarbital is similar to that of the thiouracil treated patient. The combined use of thiobarbital and iodine produced satisfactory involution of the thyroid gland.

The high percentage of reactions to thiobarbital has led to the use of thiobarbital for only those patients unable to tolerate thiouracil.

JOHN E. KIRKPATRICK, M.D.

Barr, D. P., and Shorr, E.: Observations on the Treatment of Graves' Disease with Thiouracil. *Ann. Int. M.*, 1945, 23: 754.

Among 100 cases of thyrotoxicosis treated with thiouracil, remission was induced in 87. The drug exerted a beneficial effect on emaciation, tremor, hyperkinesis, and the circulatory symptoms; also on the basal metabolic rate, cholesterol levels, the creatine defect, and on the tendency of thyrotoxic patients to lose nitrogen, calcium, and phosphorus. Protrusion of the eyeballs was not decreased, but lid spasm and lid lag were decreased or controlled.

Benefit from thiouracil was often apparent in less than 10 days, and normal conditions were usually attained within 40 days. Factors tending to retard the rate of response were the previous use of iodine and large nodular goiters.

Of the 100 cases, 73 presented successful results in the sense that the thyrotoxicosis was maintained in remission. In 37 of the 73 cases, the drug was withdrawn for from 2 to 16½ months without relapse.

There were 3 deaths from circulatory complications, but none could be justly ascribed to the action of the drug. In 12 cases, unfavorable symptoms resulted in withdrawal of the drug. Two cases of agranulocytosis were encountered.

SAMUEL KAHN, M.D.

Snitman, M. F.: Carcinoma of the Larynx; Significance of the Histopathological Study of Serial Sections; Preliminary Report. *Arch. Otolar.*, Chic., 1945, 42: 178.

This report concerns itself with the histological study of a block of laryngeal tissue removed by thyrotomy. The block of tissue included about 0.5 cm. of the anterior end of the right true and false cords.

Microscopic study revealed incomplete removal of the cancer *in situ* of the right true cord. Although the lesion involved almost exclusively the region of the glottic lip of the entire length of the true cord tissue, there was no subglottic or ventricular extension. The presence of a greater length of cancer *in situ* anterior to the hornifying carcinoma, and of only a small amount posteriorly, caused the author to conclude that the lesion grew to the anterior commissure and extended to the opposite cord.

A true picture of the laryngeal pathological changes could not be determined from the original specimen. It is believed that serial histological studies of laryngofissure specimens would prevent delay in the management of residual malignant neoplastic tissue. NOAH D. FABRICANT, M.D.

Ivanissevich, O., and Ferrari, R. C.: The Treatment of Extensive Pharyngostomies following Laryngectomy (El tratamiento de los grandes faringostomas consecutivos a la laringectomia). *Bol. Inst. clin. quir.*, B. Air., 1945, 21: 266.

Before the development of the modern technique, extensive pharyngectomy following laryngectomy was frequently necessary because of necrosis and infections of the operative field. As a rule, such infectious processes heal spontaneously or the remaining small fistulas close following minor surgical procedures. However, in a certain number of cases, infections or necrotic processes produce an extensive pharyngostomy especially if a large portion of the anterior aspect of the pharynx perishes. Fortunately such cases are rare.

As a rule, pharyngostomies develop in patients irradiated prior to the operation because the connective tissue undergoes certain changes. Because of such changes in the surrounding tissues, a repair of pharyngostomy is very difficult and disruption of the wound is the rule rather than the exception.

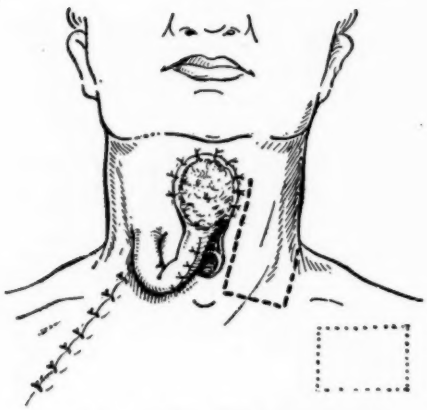

Fig. 1. Second stage of the operation.

In 4 cases the authors succeeded in reconstructing the pharynx by using a tubular cervicothoracic flap. When the suture line of the tube formed a scar, the circulation at the distal end of the tube was interrupted by the application of an elastic forceps for gradually increasing periods of time. When in the surgeon's opinion the blood supply to the tube from the proximal end was sufficient, the lower end was severed and the so-called delayed flap was placed in proper position to cover the defect in the pharynx. The proximal end of the tubular flap was placed in the vicinity of the pharyngostomy while the lower end of the tube was placed below the clavicle and more to the side than the proximal end. To cover the defect, the distal end of the tube was turned upward and the upper portion of the tube was sectioned. The defect which was produced by formation of the tubular flap was closed with interrupted sutures.

Another rectangular flap was prepared from the opposite side of the anterior aspect of the neck, with the base at the level of the defect in the pharynx. The flap was rotated 90 degrees so that instead of pointing downward, it lay in a horizontal direction. The defect created by the change of the position of the rectangular flap was covered by a transplantation of a free flap from the subclavicular region.

Chromic catgut was used for suturing the tubular flap to the pharyngeal wall.

JOSEPH K. NARAT, M.D.

SURGERY OF THE NERVOUS SYSTEM

PERIPHERAL NERVES

Sunderland, S.: The Blood Supply of the Peripheral Nerves; Practical Considerations. *Arch. Neur. Psychiat.*, Chic., 1945, 54: 280.

Free and extensive mobilization of the nerves, often required in peripheral nerve surgery, necessitates the division of many arteriae nervorum which bind the nerve to an accompanying arterial channel. The sacrifice of many nutrient vessels, fortunately, does not seriously jeopardize the nutrition of the nerve. Nerves are abundantly vascularized, the anastomoses are numerous, and there is considerable overlap of supply. Experimental work has shown that the collateral circulation of a nerve is efficient even when the nerve is freed from the surrounding tissues over a considerable distance.

The author suggests the preservation of the superficial longitudinal vessels which lie in the epineurium and anastomose along the course of the nerve, and advises ligation and division of the nutrient vessels some distance away from the nerve in order to preserve the vascular anastomoses. Furthermore, should a large nutrient vessel be torn or divided at the surface of the nerve, it may retract into the epineurium and cause troublesome hemorrhages which result in damage to superficial nerve fasciculi and the formation of an undesirable scar.

GEORGE PERRET, M.D.

Fig. 1. Superficial blood supply of the peripheral nerve.

BRAIN AND ITS COVERINGS; CRANIAL NERVES

Eaglesham, D. C.: Radiological Aspects of Intracranial Pneumocephalus. *Brit. J. Radiol.*, 1945, 18: 335.

The author states that head injuries may lead to the introduction of air into the cranial cavity, and he discusses its occurrence in 22 cases observed at the Basingstoke Neurological and Plastic Surgery Hospital, R.C.A.M.C., from July, 1942 to April, 1945.

The great majority of cases occur in conjunction with fractures through the accessory air sinuses. Nontraumatic pneumocephalus may result from erosion through the paranasal sinuses of a tumor or an infective process. Although gas producing organisms may be introduced into the cranial cavity with a resultant formation of gases, these are considered essential to the discussion, especially with regard to the differential diagnosis. Two examples of this condition are given in which the underlying pathological process was cerebral abscess.

The radiological points favoring gas producing cerebral abscess, as contrasted with other causes of pneumocephalus, are: (1) the gas is remote from the usual source of pneumocephalus, i.e., the accessory sinuses; (2) multiple gas pockets are close together; and (3) a larger space-occupying effect than the amount of gas would suggest with a pineal shift.

Points favoring intracerebral pneumocephalus rather than gas producing abscess are (1) the presence of gas in the subarachnoid or subdural space in addition to that in the cerebrum, and (2) a rapid appearance or a rapid increase in the amount of gas seen. This, for instance, may sometimes occur in traumatic pneumocephalus if the patient blows his nose.

Porencephaly may also be confused with pneumocephalus after an encephalogram has been made. In porencephaly the ventricular shift, if any, is to the affected side; more gas is seen than was considered to have been introduced; the gas pocket is at a distance from the accessory sinuses; and there is persistence of the gas pocket after the air is absorbed from the ventricles and the subarachnoid space. Intracranial lipomas may give a certain radiotranslucence, but less than air or gas, and in the case of the latter there is not any calcification at the margins. On occasion air introduced accidentally at lumbar puncture may appear in the cranial cavity.

From the standpoint of radiological technique, stereoscopic views are always necessary to determine the extent of the shadows. An attempt should also be made radiologically to determine the source of the gas. This involves a study of the nasal and mastoid sinuses, with special reference to the cribriform plate.

All of the cases under discussion were of traumatic origin. Only 6 were due to gunshot wounds, the others being so-called closed head injuries which occurred in road accidents. The total number of patients with gunshot wounds, from which the 22 cases were culled, was 814. In some cases the exact origin of the pneumocephalus was not found. Four patients developed meningitis. When the possibility of pneumocephalus exists, radiological re-examination may be necessary from time to time.

ADRIEN VERBRUGGHEN, M.D.

Rodriguez, B., Barrios, R. R., and Oreggia, A.: A New Type of Pedunculate Syndrome. Anterior Nuclear Ophthalmoplegia and Bilateral Cerebellar Syndrome Caused by Tegmental Lesion (Un nuevo tipo de sindrome peduncular. Oftalmoplejía internuclear anterior y síndrome cerebeloso bilateral por lesións tegmental). *Arch. urug. med.*, 1945, 27: 353.

The author reports the clinical history of a 62 year old woman who developed a vascular syndrome of the mesencephalon. The area of softening was located in the peduncular tegmentum. The clinical picture, which had a sudden onset, comprised two groups of disturbances: paralysis of the associated ocular movements of a very peculiar type (anterior internuclear ophthalmoplegia), and a bilateral cerebellar syndrome with dysarthria. In the early stages of the disease there was also a hemiplegia which receded rapidly. Several signs pointed to the involvement of the posterior longitudinal bundle. The motor inco-ordination comprised hypotonus, hypermetria, asynergia, and adiadokocinesis.

The authors consider the lesion as belonging to the mesencephalic syndrome and they propose the name of oculocerebellar syndrome caused by a tegmental lesion. JOSEPH K. NARAT, M.D.

Worth, L. H.: Staphylococcal Leptomeningitis Treated with Intracisternal Penicillin. *Lancet*, Lond., 1945, 249: 634.

The author presents the case of a soldier who was admitted to the hospital with a diagnosis of epilepsy. A lumbar puncture was done. Ten days later the site of the puncture was found to be infected and an interspinous abscess was opened. Penicillin was given intramuscularly preceding and following the operation, but no benefit was observed.

Almost 2 months later, the patient was again operated upon. At this time an extradural abscess was found and drained through a small laminectomy opening. After a period of 4 days, obvious leptomeningitis was diagnosed. Another laminectomy, with removal of all dead bone, was done. A pocketed extradural abscess was drained. Cisternal punctures revealed cerebral fluid with 11,000 white cells and a definite staphylococcus aureus on culture. Large doses of penicillin were given by the cisternal route and the patient recovered.

The author reviews the experiences of other individuals who have used penicillin either intraventricularly or cisternally. He believes that the cisternal route of administration offers advantages over the lumbar route in pyogenic meningitis, and discusses the reasons for this.

PAUL MERRELL, M.D.

Blumenfeld, C. M., and Gardner, W. J.: Disseminated Oligodendroglioma. *Arch. Neur. Psychiat.*, Chic., 1945, 54: 274.

The authors present a case of oligodendroglioma which was disseminated throughout the ventricles and in the leptomeninges. The patient was examined over a period of 14 years during which he underwent a craniotomy twice. At the age of 17 he developed headaches and petit mal-like attacks and showed signs of dyspituitarism with roentgenological evidence of a pituitary gland tumor. Encephalography revealed a dilatation of both lateral and the third ventricles, and at operation a thickened arachnoid was found in the region of the optic chiasm. The patient continued to have headaches and attacks, but lost many of his hypopituitarylike characteristics. Skull films made at the age of 24 showed calcifications in the tips of both inferior horns and in the left posterior horn of the lateral ventricles. At the age of 31 he developed convulsive seizures, ataxia, hypotonia, and had a bilateral optic nerve atrophy. He was then reoperated upon, and a cystic tumor was found posterior and superior to the optic chiasm. The patient died, and at autopsy a tumorous growth was found plastered on the walls of all the ventricles, the aqueduct of Sylvius, and the leptomeninges in various areas. The main portion of the tumor apparently originated in the hypothalamic region and had subsequently destroyed it. Histological studies proved the tumor to be an oligodendroglioma and to have undergone mucinous degeneration.

Eleven other cases reported in the literature, in which an oligodendroglioma had become disseminated through the cerebrospinal fluid pathways, are discussed and furnish a basis for the opinion that oligodendrogliomas may be neither as localized nor as slow growing as is usually thought.

GEORGE PERRET, M.D.

Christensen, J. C. : Tumors of the Third Ventricle. Personal Experience in 5 Cases. (Tumores del tercer ventriculo). *Bol. Soc. cirug. Cordoba*, 1945, 6: 286.

The author realizes that conclusions drawn by him from his experience in 5 cases cannot be generalized without a chance of error.

In one case the tumor of the third ventricle was coexistent with an astroblastoma and tuberous

sclerosis, while in another with an isomorphous glioblastoma, a lymphangioma of the neck, and multiple nevi. An intracranial hypertension without major focal symptoms was characteristic for the entire series of 5 cases. In 3 patients paroxysmal attacks were due probably to a transitory blockade of the circulation of the cerebrospinal fluid either in the region of Monroe's foramen or in the cavity of the third ventricle.

The clinical examination revealed disturbances of the ocular motility, hypotonus, and binasal hemianopsia in all cases; hypothalmic and mental symptoms were particularly marked in 1 case but were present to a lesser degree in other cases. In 1 patient a premature puberty and obesity appeared at an age younger than 10 years, immediately following the extirpation of the tumor. One patient developed a moderate obesity of adiposogenital character after the operation.

In 3 patients an exact diagnosis has been made on the basis of ventriculographic findings, while in the remaining cases encephalography was employed.

In all cases the right transfrontal approach has been used. This type of approach is suitable for removal of all tumors of the third ventricle except those located in the posterior part.

Ventricular drainage according to Dott's technique should be employed if a considerable time elapses between ventriculography and the operation or if the surgical procedure is performed in two stages. The drainage should also be employed during and immediately after the operation.

Only 1 death could be attributed to the operation. The author considers operative results in tumors of the third ventricle as satisfactory. One year after the operation 3 patients were in a good condition while the fourth noticed a recurrence of the symptoms 3 months following the surgical intervention.

JOSEPH K. NARAT, M.D.

SPINAL CORD AND ITS COVERINGS

Rocca, E. D., and Valladares, H.: Injuries of the Spine (Traumatismos del raquis). *Arch. Soc. Cirujanos Hosp.*, Santiago, 1945, 15: 626.

The authors report 25 cases of various spine injuries, reviews the mechanism of various lesions, and describes their symptomatology and treatment.

Dislocation occurs most frequently in the cervical region, mostly between the atlas and the axis or between the fifth and sixth cervical vertebrae. In the dorsal region a dislocation is observed most frequently between the eleventh and twelfth dorsal or between the latter and the first lumbar vertebra. Dislocations of the lumbar spine are rare on account of the firm fixation of the vertebrae.

Fracture-dislocation may be followed by a tear of the venous plexus located in the epidural space, with resulting hemorrhages on the anterior, lateral, or posterior aspect of the spinal cord. Blood may accumulate in the epidural, subdural, or subarachnoid space and this may be followed by intraspinal hemorrhage with a subsequent development of arachnoiditis. One of the authors' cases illustrates such a condition.

The most frequent site of fractures of the spinal apophysis is the thoracic or cervical portion of the spine.

A fracture of the vertebral arches involves the atlas or the axis in a great percentage of cases.

Fractures of the vertebral body are caused nearly exclusively by an indirect trauma. In this type of fracture a medullary shock or concussion of the spinal cord is frequent and may produce a physiological section of the cord, with a grave prognosis.

Fracture-dislocations of the spine are produced, in a great percentage of cases, by indirect trauma caused by a hyperflexion or hyperextension.

Injuries by missiles may sometimes create a picture of an anatomic section of the spine while in reality only a physiological section is present. The authors describe 1 such case in which a projectile produced an irreparable physiological section of the cord.

The degree of disintegration of the white or gray substance of the cord after a concussion depends on the intensity of the nutritional disturbances. This fact explains the appearance of medullary symptoms weeks or months after the trauma.

Medullary lesions may be situated at points distant from the site of trauma. For instance, 1 of the authors' patients sustained an injury of the dorsal region of his spine and yet the resulting myelomalacia involved the entire medullary tract. Hematomyelia or intramedullary hemorrhage, which may be produced by any type of trauma, affects the cervical portion more frequently than any other region of the spine. The original trauma may be transmitted through the column of the cerebrospinal fluid and cause hemorrhages in the gray substance at distant places.

Surgical intervention is indicated in the treatment of spinal injuries (1) if compression of the cord is demonstrated by the Queckenstedt test, stereoscopic roentgenograms, pneumospinograms, and myelograms, (2) if after a favorable evolution, neurological symptoms of compression indicate that scar tissue is the responsible factor, and (3) if symptoms of compression appear following orthopedic maneuvers.

The authors employ local anesthesia for intervention on the spine in all cases with very few exceptions. Tidal irrigation is recommended for the treatment of the cord bladder, supplemented by the administration of sulfa drugs. The necessity of collaboration between orthopedic surgeon and neurologist is stressed. JOSEPH K. NARAT, M.D.

Guthkelch, A. N.: The Management of Recent Fracture Dislocations of the Cervical Spine. *Brit. M. J.*, 1945, 2: 880.

In fracture dislocations of the cervical spine with cord symptoms, Crutchfield tongs may be applied and the patient may then be nursed in the sitting

position. This is the main point set forth in the present article. Seven cases were treated in this way with satisfactory results. There were 4 deaths but these occurred in complete transverse lesions of the cervical cord, and the lesions could be regarded as incompatible with life from the beginning.

The method is simple and can be applied anywhere. A stout post is lashed to the head of a bed and a pulley is fixed to it; the tongs are applied in a line slightly anterior to the pinna; a back rest is elevated until the patient is raised up to an angle of 60°; the tongs are weighted through the pulley with 18 pounds. Portable x-ray pictures are taken in half an hour and if there is no radiological change, 4 pounds are added. X-ray pictures are taken every half hour and weight is added until the dislocation is reduced. When this happens, from 8 to 12 pounds of weight are applied and maintained for at least 3 weeks; then the weight is further reduced for 10 days and the patient is allowed up in a plaster cast.

The sitting position has several advantages: (1) gravity is used for traction, (2) the upward thrust of abdominal viscera is avoided, and this is important in patients who have respiratory difficulties, and (3) the patient is able to look around, swallow properly, and read. These factors promote better results than can be obtained in the usual lying position and they improve the morale of the patient.

ADRIEN VERBRUGGHEN, M.D.

SYMPATHETIC NERVES

Wilson, H.: Thrombosis of the Brachial Artery Treated with Successive Cervical Sympathetic Blocks. *Am. J. Surg.*, 1945, 70: 255.

Blocking of the sympathetic chain is useful in the treatment of occlusive vascular disease, both of an acute and chronic nature. In thrombosis of a major vessel there is spastic contraction of the collateral channels which further decreases vascular supply to the part. Sympathetic block will relieve such spasm.

A case treated by such a procedure is presented. The patient was a 29 year old soldier whose right arm was pinned to the ground for 30 minutes as the result of an accident. He had a fracture of the left clavicle and contusions of the right chest wall and arm, and of the face. The arterial pulse could be felt above the point where his arm had been pinned, but not below. The right hand was cool and moist; the sensory and motor functions in the right arm were both greatly reduced. Since no hematoma was present, it was thought that the patient had a severe spasm of the right brachial artery. Three hours and twenty minutes after the accident a right cervical sympathetic block was performed with 2 per cent procaine. The results were inconclusive. Five successive blocks were performed at intervals of approximately 3 hours. The hand and arm were warmer after each block, but the effect usually disappeared in about 2½ hours.

After 72 hours a weak radial pulse was felt, but this disappeared 3 days later. Sensation became normal, but the patient had only 50 per cent use of the intrinsic hand muscles.

Four weeks after the injury, the radial pulse was still absent; so the diagnosis was changed to thrombosis of the brachial artery rather than spasm.

Procedures now in use in arterial injuries include ligation of a partially severed artery with its concomitant vein followed by sympathetic procaine block. Blakemore's nonsuture method of bridging the arterial defects is occasionally used, but a thrombosis or blowout may occur later. A procedure sometimes recommended is resection of part of an artery to interrupt the sympathetic supply distal to the resection. However, sympathetic block is easier and more complete. The author favors repeated procaine blocks rather than alcohol because of the occasional occurrence of complications such as severe neuritis which follows the use of the latter.

The deleterious effect of applying external heat to the affected extremity with the resultant increased oxygen demand is also stressed.

ROBERT E. GREEN, M.D.

MISCELLANEOUS

Wolf, G. A., Jr., Goodell, H., and Wolff, H. G.: Prognosis of Subarachnoid Hemorrhage. *J. Am. M. Ass.*, 1945, 129: 715.

In order to formulate a plan of management of patients with spontaneous subarachnoid hemorrhages, the authors studied a group of 46 patients from the New York Hospital. The diagnosis of a subarachnoid hemorrhage was verified either by postmortem examination, operative visualization, or the finding of xanthochromic and bloody spinal fluid. There were no differences in sex distribution. The greatest number of cases occurred in the fifth decade, the cases being twice as common as at any other period.

Fifteen per cent of the patients had a previous history of migraine headaches, while 26 per cent had noted recurrent headaches. It was noted that the majority of patients were engaged in ordinary activity at the time of the rupture and a history of precipitating factors could not be elicited.

It was impossible to correlate the signs and symptoms with the prognosis—either immediate or late. It is of interest that many of the patients who fully recovered had lost consciousness and had convulsions at the onset of the illness. Eleven postmortem examinations demonstrated aneurysms in 5 cases, but no demonstrable source of bleeding could be found in 6 of the cases.

By reviewing the current literature and their own series the authors promulgated the following percentage probabilities: with the first episode of bleeding, 29 per cent of the patients entering the hospital die; of the survivors, 14 per cent die from recurrent bleeding between the second and fourth week, and another 5 per cent die within one year.

Based upon the previous probabilities and surgical mortality rates, an excellent management guide has been formulated.

1. Within the first or second week the surgical risk of craniotomy is worth while if the general condition of the patient is satisfactory, bleeding has stopped, and the aneurysm has been verified by arteriography. If the arteriograms are negative, the patient should be confined to bed for from 4 to 6 weeks. In Dandy's surgical series arteriography was not used.

2. If after a period of one month there are persistent or residual signs or symptoms, arteriography should be done. Surgery would depend upon visualization of the aneurysm, its site, and the status of the patient's general and neurological condition.

3. If the patient has no signs or symptoms directly referable to the aneurysm after the first month, arteriography and surgery are optional since the surgical mortality at the present time is higher than the mortality of conservative treatment. Migraine headaches, if present, should be carefully treated during the medical regime because of the possibility of further damage to the aneurysmal wall from repeated vasodilatations. JACK I. WOOLF, M.D.

Kennedy, F., Somberg, H. M., and Goldberg, B. R.: Arachnoiditis and Paralysis following Spinal Anesthesia. *J. Am. M. Ass.*, 1945, 129: 664.

The authors review many of the sequelae which have been reported following spinal anesthesia, and which involve the nervous system. These symptoms comprise stiffness of the neck, involvement of the cranial nerves (second, third, fourth, sixth, seventh, eighth, and twelfth), impaired bladder and rectal function, hemiplegia and paraplegia, degeneration of the pyramidal tract, meningoencephalitis, polioencephalitis, myelitis, myelopathy, radiculitis, severe neuritis, septic and aseptic meningitis, arachnoiditis, neuritis of the cauda equina and other conditions.

One case is reported in which a middle aged female developed neurological symptoms approximately 2 weeks after spinal anesthesia, which had been given in connection with a pelvic operation. The patient complained of numbness and weakness of the lower extremities, pain in the back, which progressed upward into the shoulder girdle, and a subsequent development of radiating pain into the hand. Incontinence of the urine and feces appeared later. Studies of the spinal fluid revealed a partial block in the canal, with increased protein. A diagnosis of "arachnoiditis, secondary to spinal anesthesia," was made, and a laminectomy performed.

Destructive arachnoiditis was demonstrated at about the twelfth thoracic segment. Some improvement followed surgery.

A second patient, a male of 50, was reported as having adhesive arachnoiditis following spinal anesthesia, which was localized at the conus medullaris. Slight improvement followed surgery, but a major disability resulted.

A third patient, a male of 29, was paralyzed in the lower extremities three weeks after a spinal anesthesia, and laminectomy revealed adherent arachnoiditis extending from the fourth to the tenth thoracic spinal segment. Some improvement in the condition of the legs followed, but a considerable degree of disability persisted.

The authors believe that a chemotoxic effect of the anesthesia plays a definite part in the production of such symptoms, and this is true particularly if there is any pre-existing disease of the nervous system. HOWARD A. BROWN, M.D.

SURGERY OF THE THORAX

CHEST WALL AND BREAST

Duany, N. P.: Etiological Consideration concerning Cancer of the Breast (Consideraciones etiológicas sobre el Cáncer de la mama). *Arch. Cubanos Cancer*, Habana, 1945, 4: 121.

Up to 1945, 13,500 malignant tumors and 6,500 benign lesions were treated at the Radium Institute in Havana. One thousand and twenty-three patients had tumors or other lesions of the breast, among them being 1,262 malignant and 463 benign tumors. Of 1,262 patients with malignant tumors, 1,248 were women, and of 463 patients with benign lesions, 457 were women. Among the benign lesions the following were observed in descending order of frequency: fibroadenomas, chronic mastitis or functional hyperplasia, cystic mastitis, suppurative mastitis, papillomas, sebaceous cysts, and gynecomastia.

Cancer of the breast was exceeded in frequency only by cancers of the uterus, oral cavity, and skin.

Cancer of the breast occurred with greatest frequency in the sixth decade of life, to be followed by the fourth, fifth and eighth decades in which cancer occurred with approximately equal frequency. Then in descending order of frequency were the seventh, ninth, tenth, third, and second decades, other ages accounting only for a very small number of cases.

Seventy-eight per cent of the patients with cancer of the breast belonged to the white race; 10 per cent were negroes, and 12 per cent were of mixed race. The entire population consists of 74.4 per cent of white people and 25.6 per cent of negroes and those of mixed blood.

In the author's material cancer of the breast occurred three times as often in multiparae as in nulliparae.

The relation between trauma and the development of sarcoma can be established much easier than that between trauma and the development of cancer.

In the author's material cancer was found in the patient's mother or father in only 1.1 per cent of the total. Apparently such antecedents are of no great importance.

The term "mastitis," used by older pathologists, apparently means nothing but hyperplasia gradually developing in women over 35 years of age. The term "mastitis" should be applied only to an inflammatory process. Evidence of such acute and chronic lesions was found by the author in only a small percentage of his material.

He concludes that apparently no relations of any importance exist between inflammatory processes and cancer of the breast.

A hereditary tendency toward cancer could not be definitely confirmed by the author's observations.

JOSEPH K. NARAT, M.D.

TRACHEA, LUNGS, AND PLEURA

Crafoord, C., and Lindgren, A. G. H.: Mucous and Salivary Gland Tumors in the Bronchi and Trachea. *Acta chir. scand.*, 1945, 92: 481.

The authors' material of so-called bronchial adenomas comprises 14 cases, the tumors being localized to the bronchi in 9 cases and to the trachea in 5 cases.

These adenomas were demonstrated to belong to the group of mucous and salivary gland tumors, and, like such tumors in other locations, they may be classified as benign, semimalignant (Masson, Reuterwall), and malignant. Of this series, 7 were benign, 5 semimalignant, and 2 malignant.

The classification of the tumors in question as mucous and salivary gland tumors explains both the clinical course of the cases and the biological character of the tumors.

Tumors of this kind are generally benign, but sometimes they display signs of a certain local histological malignancy by producing infiltration and destruction and by causing metastases. However, the degree of malignancy generally appears to be low.

The authors believe that these tumors should be radically removed, if technically possible, as it is difficult to determine their malignancy or nonmalignancy histologically in excised material. It is a known fact that so-called semimalignant mucous and salivary gland tumors can occasionally change to decidedly malignant tumors in the course of time.

Abbott, O. A., and De Oliveira, H. R.: Spontaneous Pneumothoraces Occurring in Patients Undergoing Peroral Endoscopy. *J. Thorac. Surg.*, 1945, 14: 453.

There are many common complications of bronchoscopy, such as the danger of direct injury to the bronchus and underlying vessels, the dangers attending local or general anesthesia, and the occurrence of subglottic edema. All too little attention has been paid to pneumothorax as a bronchoscopic hazard.

Kahler, Soulas, and Benjamins have reported instances of pneumothorax or subcutaneous emphysema following trauma to the bronchial tree which occurred while attempting the removal of foreign bodies. Here the mechanism of the leakage of air into the mediastinum is evident.

The authors are chiefly interested in the occurrence of pneumothorax following diagnostic peroral endoscopic examination. Examination of the literature revealed only 1 case similar to the cases reported in the authors' series.

Spontaneous pneumothorax most commonly is attributed to the rupture of a subpleural tuberculous focus. Other causes are pneumonia, pulmonary gangrene, bronchiectasis, lung abscess, foreign body,

empyema, tumor, congenital cysts, and pulmonary emphysema. Perforating injuries to the chest wall or injury from within the bronchial tree by sharp objects or instruments obviously may produce pneumothorax.

Pneumothorax following bronchoscopy may be due to direct injury to the visceral pleura by the bronchoscopist. However, as these patients have diseased lungs, spontaneous pneumothorax may occur without endoscopic examination. Thoracic surgeons who use the bronchoscope on patients will most likely make periodic fluoroscopic examinations and discover unsuspected pneumothoraces. A majority of cases have sufficient pleural adhesions to minimize symptoms complicating the pneumothorax. This, unfortunately, does not always occur, and the complication may lead to dire results unless one is familiar with it.

The incidence of this complication is uncertain since routine fluoroscopies are not done following bronchoscopy. The authors' 4 cases of pneumothorax following bronchoscopy occurred during a period of 12 months, during which 537 bronchoscopic examinations were made on a surgical chest service for diagnosis or therapy. No bronchoscopic examinations were carried out for the removal of foreign bodies.

The authors present 6 case reports. In none of the patients was there any evidence of direct injury to the major bronchi. In 2 cases the pneumothoraces occurring coincident to bronchoscopy were asymptomatic and were accidentally discovered by fluoroscopy. In spite of the fact that both patients had suppurative lung disease, no empyema occurred. In 1 case the pneumothorax probably was due to the rupture of an emphysematous bleb, since these are occasionally associated with patchy atelectasis in children. A similar etiology was suspected in another case.

In the third case a pyopneumothorax developed secondary to rupture of a weakened necrotic area of a peripheral abscess. This is a spontaneous phenomenon which is likely to occur in these cases. It is a hazard of the coughing paroxysm subsequent to endoscopic manipulation rather than a complication of the procedure.

The fourth patient had advanced tuberculosis and far advanced pulmonary emphysema. Either or both etiological agents may have played a role during the postbronchoscopic coughing paroxysms.

The fifth patient had no postbronchoscopic pneumothorax, but died as a result of bronchoscopy and the associated coughing attacks. Possibly the explanation may be that in pulmonary emphysema, compression stenosis of the trachea may account for dyspnea with coughing attacks; however, the true explanation remains a mystery.

The sixth case described is rare and may be used to support Hammen's theory that spontaneous mediastinal emphysema may advance to the production of a pneumothorax. Two explanations have been advanced: (1) the air travels along the interstitial bands of connective tissue to the pleural surface of the lung which ruptures; (2) the air in the mediastinum achieves sufficient tension to rupture the thin mediastinal wall into the pleural cavity. Most evidence seems to support the second route as the most likely.

Pneumothorax has many serious dangers attendant upon it, and a consciousness of this complication in association with peroral endoscopy should prove lifesaving in some instances.

ROBERT R. BIGELOW, M.D.

Melick, D. W., and Spooner, M.: Experimental Hemothorax. *J. Thorac. Surg.*, 1945, 14: 461.

Experimental evidence is presented in support of the theory that blood coagulates normally in the pleural cavity. Blood introduced into the pleural cavities of dogs coagulates normally. Both the liquid portion of the blood and the clot are readily absorbed. The liquid portion disappears within from 10 to 14 days, and the clot decreases in size to such an extent that it may be overlooked. After 2 weeks have elapsed, little evidence remains to show that blood had previously been present in the pleural cavity.

The red cells are not laked immediately after introduction into the pleural cavity. They are recognizable after 5 days, although some are fragmented at that time. The fragmented erythrocytes are taken up by the macrophages, and appear as hemosiderin within the phagocyte.

The liquid portion of the blood will not clot, as it consists only of serum and cells, and will remain incoagulable indefinitely. Fibrinogen added to this liquid portion, however, will bring about coagulation. The pleura itself does not elaborate an anticoagulant.

SAMUEL KAHN, M.D.

Burford, T. H., and Burbank, B.: Traumatic Wet Lung. *J. Thorac. Surg.*, 1945, 14: 415.

In all wounds of the chest the lung tissue reacts to a greater or lesser degree, according to the severity and type of the lesion, to produce more than its normal amount of interstitial and intra-alveolar fluid. The bronchopulmonary tree not only has more fluid of which to rid itself, but also becomes less capable of doing this. The result of these factors may be called the "wet lung" of trauma. On the degree of "wetness" and on its recognition and treatment depends the outcome in many cases.

The primary phase of this syndrome finds the patient apprehensive. Dyspnea, accompanied by paroxysms of painful cough, is present. The cough, however, does not serve to empty the bronchopulmonary segments. On examination, there is found restriction of motion of the involved side, with diminished breath sounds. The outstanding feature is the presence of rales bilaterally, but more marked on the affected side. In some instances the patient appears to be having a typical attack of bronchial asthma. In many cases the condition resembles nontraumatic pulmonary edema.

Recognition of the presence of "wet lung" should not detract from the importance of other lesions which may be present. The necessity for the proper treatment of these lesions must be stressed.

In treating "wet lung" the aim must be to control the production of moisture and to promote adequate bronchial drainage. Since pain, originating in the traumatized thoracic cage structures, is the most important factor in the development of the unfavorable cycle of events, and since the pain interferes seriously with an effective cough mechanism, the pain must first be combated. The use of morphine and adhesive strapping is physiologically unsound and ineffective. The use of procaine injections, either at the site of injury by intercostal nerve block, or by thoracic paravertebral sympathetic nerve block, gives gratifying results which are often dramatic.

While the abolition of pain and the reinstitution of a painless, effective cough mechanism are essential, other forms of therapy are often also necessary. The bronchopulmonary tree may be flooded. The secretions should be mechanically evacuated by tracheobronchial catheter aspiration. In some cases, atropine given intravenously may be of value. In the more resistant cases, oxygen, delivered at a positive pressure of from 6 to 8 cm. of water, is of benefit.

Traumatic "wet lung" must be differentiated from bronchial asthma, pulmonary edema of cardiac origin, pulmonary edema seen in peripheral vascular failure, and from blast lung. SAMUEL KAHN, M.D.

McDonald, J. R., Moersch, H. J., and Tinney, W. S.: Cylindroma of the Bronchus. *J. Thorac. Surg.*, 1945, 14: 445.

Six cases of cylindroma of the lung are reported. The clinical course was remarkably similar to that of adenoma of the bronchus, with the exception that in 1 case the neoplasm involved the trachea. The bronchoscopic appearance of the tumor also was similar to that of adenoma of the lung. The lung which is the seat of a cylindroma grossly resembles that in which an adenoma is found in that bronchiectasis and lung abscess are common sequelae to the long-standing obstruction produced by the tumor. Cylindroma histologically presents a different appearance from that of adenoma of the bronchus and seems to be more closely allied to mixed tumors.

Valle, A. R., and White, M. L., Jr.: Penicillin in Pulmonary Resection. *J. Thorac. Surg.*, 1945, 14: 437.

Pulmonary resection in recent years has become a refined surgical operation with a mortality which is comparable to that of the major abdominal procedures. This development is due to (1) increased knowledge of thoracic physiology and pathology, (2) progress in anesthesia, (3) increased knowledge of shock and fluid and blood replacement, (4) increased knowledge of the surgical anatomy of the lungs, and (5) developments in chemotherapy.

Chemotherapy, the most recent development, has contributed to the control of infection of the parenchyma, pleura, and chest wall. For the last 5 years the sulfonamides have controlled postoperative pneumonias and diminished pleural infections. The discovery of penicillin opens a new field in the control of postoperative pleural infections. White, Nicholson, and Stevenson, and D'Abreu, Litchfield, and Scott have all demonstrated the protective value of penicillin in controlling pleural infection. D'Abreu and his coworkers have shown that penicillin instilled in the pleural cavity is retained for as long as 3 days while, conversely, its passage from the blood stream into the pleural cavity is slight. In a recent article, Blades reported that the incidence of empyema in a penicillin-protected and control series was about the same.

In the present article, the authors compare the course and results in patients with pulmonary resection who were treated with and without the administration of penicillin. The authors discuss their technique of pulmonary resection and stress the problem of drainage and the method of using the penicillin.

Preoperatively, for 2 or 3 days, 10,000 units of penicillin were given intramuscularly every 3 hours. This was usually continued postoperatively for 3 or 4 days, and over a period of 7 days in heavily contaminated cases. Fifty thousand units of penicillin in 10 c.c. of saline were injected into the pleural space through a catheter at the completion of the operation. For 6 or 7 days after operation, 50,000 units of penicillin were injected daily into the pleural space through the catheter or (after removal of the catheter) following thoracentesis.

This series consisted of 48 consecutive pulmonary resections carried out during a period of 31 months, the first 28 without penicillin, and the last 20 with penicillin therapy as described. The two groups were roughly similar as to diagnosis and operative procedure.

In group 1 (without penicillin) there were 25 lobectomies and 3 pneumonectomies. Of the lobectomies, 15 were for bronchiectasis, 4 for tuberculosis, 3 for lung abscess, and 3 for cystic disease. Two of the pneumonectomies were for carcinoma and 1 for sarcoma. Nineteen of the 25 cases (76%) involved some division of pulmonary tissue and were considered as contaminated.

In group 2 there were 15 lobectomies and 5 pneumonectomies. Of the pneumonectomies, 3 were for bronchiectasis, 1 for carcinoma, and 1 for tuberculosis; of the 15 lobectomies, 11 were for bronchiectasis, 2 for tuberculosis, 1 for pulmonary cyst, and 1 for lung abscess. In 12 cases (80%) there was division of pulmonary tissue with grossly contaminated pleural spaces.

In group 1, two of the pneumonectomies were uncomplicated; the third patient developed a bronchial fistula with a fatal empyema. Bronchial fistulas developed in 10, or 40 per cent, of the patients who had undergone lobectomy. One patient

with pneumonectomy and all patients with lobectomies developed empyema. Tubal drainage for an average of 12 weeks was required.

Of the pneumonectomies in group 2, all patients had uncomplicated recoveries. Of the lobectomies, none of the patients developed a bronchopleural fistula and only 1 patient developed an empyema.

Fourteen per cent, or 4, of the patients in group 1 developed chest wall infections, while no case in group 2 was so complicated.

The patients in group 2 showed a marked decrease in days of hospitalization and an earlier day of rising after operation. The average febrile reaction was slightly less than that of the patients in group 1.

Aspiration of the chest in group 2 patients on the first postoperative day yielded from 400 to 500 c.c. of fluid. The quantity decreased rapidly and thoracentesis was seldom needed after the seventh day. Except for empyema in 1 case, all cultures were negative. This was in marked contrast to the common empyemas in group 1.

Three of the patients in group 1 died—one of these (who had had a pneumonectomy) from an empyema due to a bronchial fistula, another as the result of a tuberculous pneumonia, and the third patient, from a suppurative pericarditis secondary to a small basal empyema. One patient in group 2 died as the result of an extensive tuberculous spread.

The authors discuss in detail the single case of empyema in group 2, which represents a cure of empyema with penicillin, and without surgical drainage. An interesting case of lobectomy (group 2) in which pus was spilled into the pleural cavity is also discussed. Here, in spite of extensive gross contamination, no pleural or chest wall infection developed.

The authors attempt to show the advantage of using penicillin intrapleurally and intramuscularly in pulmonary resection without drainage of the space. They believe that the evidence points to protection of the pleural space from infection by penicillin. Blades reported that 11 of 29 patients who were treated with penicillin developed empyema. The difference between these figures and the authors' figure of 1 case in 20 probably can be explained by the fact that the authors do not drain the pleural space even for a few days; therefore a high concentration of penicillin can be maintained by daily injections.

Successful bronchial closure is important, but it is not the only factor to be considered in the prevention of empyema. The authors believe that an empyema may contribute to the formation of a bronchial fistula. By maintaining pleural asepsis and maximum re-expansion of the remaining pulmonary tissue, the chances of bronchial fistula are lessened.

The clamped-off catheter left in the pleural space serves as a simple means of aspirating fluid during the 48 hours when the patient is most uncomfortable. Its advantages are that the penicillin concentration intrapleurally is kept as high as possible. Secondly, it facilitates the re-expansion of the remaining lung by the negative intrapleural pressures induced and maintained by fluid aspiration. Should an empyema develop it is apt to be small, and recovery rapid.

A striking demonstration of the value of penicillin is shown in the heavily contaminated cases in which lung tissue has been divided in the open pleura. Finally, the patient's postoperative course, with penicillin, is smoother; there is earlier rising and a shorter hospital stay. In a larger series of cases the mortality should be consistently lower since the dangers of putrid empyema and bronchial fistula are decreased with the use of penicillin.

ROBERT R. BIGELOW, M.D.

Adams, W. E., Thornton, T. F. Jr., and Carlton, L. M. Jr.: The Use of Blood Plasma for Filling the Pleural Space following Total Pneumonectomy. *Ann. Surg.*, 1945, 122: 905.

In view of the results of experiments on a variety of animals, Adams and his associates found it worth while to test the influence of filling the pleural space with plasma following total pneumonectomy in man. Eighteen patients received such treatment and 10 additional patients, used as controls, received no plasma. The usual method of management consisted in the determination of the red cell count, hemoglobin value and plasma protein prior to operation. At the time of surgery between 500 c.c. and 600 c.c. of plasma were introduced into the pleural cavity at the closure of the thoracic wall and 200,000 units of penicillin were placed in the pleural space of 9 of the 18 patients.

Between 1 and 3 days after operation, following chest fluoroscopy, the remainder of the residual air was removed and replaced with plasma usually amounting to from 200 to 400 cubic centimeters.

From the data presented, and also from studies as yet unpublished, it was evident that the greatest drop in red cell count, hemoglobin, and hematocrit readings occurred between the third and fifth day after surgery. Following this there was a slow return to normal, but in most instances the preoperative plasma protein level had not been reached by the end of the 2 weeks following operation.

The lowering of blood plasma proteins was also greatest usually by the third to the fifth day, but the fall did not always parallel that of the hemoglobin. In some patients the red cell count and hemoglobin remained at very nearly the preoperative level, although the plasma proteins fell. When the proteins were lowered to from 1 to 1.5 gm. per cent, they usually had not returned to the preoperative level by the end of 2 weeks following operation.

The average fall for 14 patients who received plasma in the pleural space was 0.90 gm. per cent. In contrast to this, the average fall for the control group was 1.48 gm. per cent or almost twice that of the treated patients. It was seen, moreover, that a high percentage of the treated patients had only a slight lowering of the plasma proteins and maintained a higher postoperative level than the controls.

The incidence of serious complications and the mortality rate were almost twice as great in the control group as in the group which received plasma in the pleural space following resection of the lung.

It is thought that although the series of patients is not large, the discrepancy between the two groups is significant.

A striking difference in the incidence of postoperative empyema and bronchial fistula was seen between the methods of bronchial closures. Of the 12 patients in whom a 2 row suture technique was employed, 4 developed an empyema, 3 of whom had a bronchial pleural fistula. In contrast with this, none of the 16 patients whose bronchial stump was closed by a single row suture technique developed either an empyema or fistula following operation.

STEPHEN A. ZIEMAN, M.D.

Delmas, J. E.: The Operative Treatment of Fistulous Empyemas following Pneumothorax (Tratamiento operatorio de los empiemas fistulizados postneumotorácicos). *Rev. espan. cir., traumat. ortop.*, 1945, 3: 170.

The author discusses the operative treatment of cutaneous fistulas complicating a spontaneous or therapeutic pneumothorax. He performed 7 thoracectomies on account of chronic empyema following pneumothorax. These cases did not include empyema following pleurisy or traumas of the chest. His material belongs to Hedblom's groups 2 and 4. Usually in such cases an encapsulated pleural cavity is found, with the mediastinum and the corresponding lung retracted; the pleura has lost its ability to expand, the ribs are practically in contact with one another and there is a corresponding deformity of the chest. Multiple fistulas with surrounding cutaneous ulcerations are present. As a rule, the condition is complicated by myocardial degeneration and visceral amyloidosis.

As to the treatment, extrapleural thoracoplasty cannot always be carried out. To replace thoracectomy, Kirschner suggested intrapleural methods after an anterior resection of the second and third ribs. In selected cases pleurectomy may be performed.

Schede's extensive thoracectomy is a very serious intervention which should be performed in stages. Monaldi suggested a combination of intrapleural and extrapleural methods. Sauerbruch performs a paravertebral columnar thoracoplasty on the first to the ninth ribs in the first stage, in the second stage he removes completely the tenth and eleventh ribs and obliterates the empyema, and in the third stage he performs a parasternal resection of the first to the eighth ribs.

The author modified Braun's procedure, which in turn is an improvement of the original Schede method. It is advisable to make the intervals between the various stages of the operation as short as possible to prevent degeneration of the thoracic wall. As a rule, in the first stage a superior paravertebral resection of from 5 to 7 ribs is performed. In the second stage a paravertebral columnar resection of the lower ribs is done and the intercostal spaces are resected. In the third stage the pleurectomy is done. Sometimes the first stage consists only of an anterior resection of the first to third ribs with corresponding cartilages; in the second stage a paravertebral resection of the first to fifth ribs is performed and the intercostal spaces are resected; in the third stage a paravertebral resection of the sixth to the eleventh rib is performed, and the fourth stage consists of pleurectomy. Great care is taken to leave the drainage tube in place during the intervention because the alteration of the thoracic wall after rib resections makes the introduction of a drainage tube into the old fistula very difficult. The intervention can be done under local anesthesia supplemented by a costopleural bloc.

The author concludes from his studies that a fistulous empyema without retention of pus in a patient in a good general condition can be treated by drainage and aspiration. A residual cavity requires a limited pleurectomy. A rigid cavity with considerable pachypleuritis should be treated by pleurectomy according to the described technique. Pleurectomy should be preceded by an interruption of the intercostal nerves. If the cavity is small, a one stage limited pleurectomy should be performed.

JOSEPH K. NARAT, M.D.

HEART AND PERICARDIUM

Watts, T. D., and Toone, E. C.: Successful Removal of Foreign Bodies within the Pericardium. *Surgery*, 1945, 18: 685.

Inasmuch as the proper management of foreign bodies within the pericardial sac has remained indefinite the authors report 2 cases in which the patients were treated by successful surgical removal. One case of successful surgical removal has been reported previously.

It is not intended to recommend, from the experience with these 2 cases and the 1 previously reported, that all foreign bodies of the pericardium should be treated surgically. For the most part the question of surgical intervention lies with the clinical appraisal of each individual case by both internist and surgeon. The patient's symptoms, the objective evidence of pericardial or myocardial changes, and the possibility of future complications are to be balanced against the operative risk. Each of these points of evaluation are at present subject to wide variations in interpretation, and a clear, concise discussion of the symptoms, the signs, the pathology encountered, and the possible complications is lacking in most reports.

The presence of extensive and dense fibrosis within the pericardium has been an outstanding finding in each case and probably is the underlying basis for the subjective complaints and the abnormal objective findings noted. As a result of this observation and especially as a result of the authors' experience with 1 patient, the optimum time for sur-

gical removal would seem to be as soon as the circulatory function becomes stable and the patient's general condition permits.

There were abnormal electrocardiographic findings in the case previously reported and in each of the cases in this report.

In the former these findings were interpreted as indicating myocardial damage because of the depth of the inversion of the T waves in Lead 4 and the failure of the patient to show improvement in the 7 weeks of observation following operation. In the 2 latter cases of this report the electrocardiographic changes were thought to be due to pericardial damage. In both instances the electrocardiogram showed a return to the normal configuration following the operation.

In addition to the immediate consequences of a foreign body within the pericardium, subsequent developments of a serious nature may result. There is always the danger of infection arising at the location of any foreign body, particularly when organic material such as clothing is present, as is often the case in penetrating shell fragment and bullet wounds. The adjacent vital structures such as the heart chambers or the great vessels may be eroded or penetrated, with serious or disastrous results.

JOHN E. KIRKPATRICK, M.D.

Diaz, F. H., Awad, S., and Pedrasa, C.: Pericarditis (Pericarditis). *Rev. med. Chile*, 1945, 73: 833.

Of 42 cases of pericarditis observed by the authors, 20 were of rheumatic origin, 7 were tuberculous, in 6 the cause could not be established, and 2 followed septicemia, 2 uremia, 3 secondary pneumococcus infection, 1 primary pneumococcus infection and 1 uremia and pneumococcus infection; 29 cases were acute and 13 chronic.

Of 20 cases of rheumatic pericarditis, 4 developed in the course of the first attack. Of the 20 cases, 15 presented valvular lesions. In 11 patients an exudative pericarditis was diagnosed, in 4 a dry type, and in 1 patient a symphysis, while in the remaining 4 cases the exact diagnosis could be established only at autopsy. The character of the exudate was established by a paracentesis in 2 patients, by autopsy in 2, and by clinical and x-ray examinations in 7. Of the first 4 cases, 2 had a hemorrhagic serofibrinous exudate, 1 case had a hemorrhage, and 1 a serohemorrhagic exudate.

Of 7 tuberculous cases, 6 had signs of polyserositis; 5 of them had an exudative pericarditis, and 1 had an adhesive form, while the seventh case presented partial constrictive chronic pericarditis.

Both uremic cases had a serofibrinous exudate.

Of 2 patients with septicemia, 1 had a hemorrhagic, serofibrinous, and the other a fibrinopurulent, exudate.

Of the 4 patients with pneumococci, 1 patient had a primary form while 3 patients had had pneumonia. One patient had a fibrinopurulent exudate, the other a purulent, the third a serofibrinous, and the fourth a fibrinous exudate.

Of 29 patients with an acute pericarditis only 1 patient presented a picture of tamponade of the heart.

Of 13 patients with a chronic pericarditis, 3 showed signs of a chronic compression.

An elevation of the sedimentation rate was noticed in the majority of patients with the rheumatic form. They had anemia, neutrophil leucocytosis, and a deviation of the blood picture to the left.

The ages of the patients with the rheumatic form ranged from 13 to 40 years, that of patients with the tuberculous type from 11 to 25 years, while the age of those with the pneumococcic form ranged from 29 to 65 years.

Of 15 patients with pericarditis, 8 showed electrocardiographic signs of an acute type, 6 those of a chronic type, and one patient had no pathological signs whatsoever.

Clinically the condition was characterized by the following signs: (1) cyanosis, (2) dyspnea, (3) venous hypertension, (4) arterial hypotension, (5) venous congestion of the neck and an inspiratory enlargement of the jugular veins, (6) edema of the lower extremities and in the reclining position also of the chest and upper extremities, (7) paradoxical weak pulse and tachycardia as a compensatory phenomenon, (8) hepatomegaly and splenomegaly, (9) ascites, and (10) cardiac manifestations such as intensified third sound to the left of the sternum, small cardiac dullness, diastolic impulse, systolic depression, and absence of the apical impulse.

Roentgenological findings are important in exudative but not in dry pericarditis.

JOSEPH K. NARAT, M.D.

Ivanissevich, O., and Martiarena, L. H.: Treatment of the Encased Heart. Chronic Constrictive Pericarditis (Tratamiento del corazon aprisionado. La pericarditis crónica constrictiva). *Bol. Inst. clin. quir.*, B. Air., 1945, 21: 239.

The authors operated on 8 patients with chronic constrictive pericarditis. Three patients were cured, 1 patient showed marked improvement in his condition, 2 patients showed temporary improvement but death occurred later on, and 2 patients succumbed to the operation.

An intervention should not be undertaken until the primary condition has passed its acute stage. This statement holds true particularly in cases of tuberculosis of the pericardium. Surgical intervention undertaken to free the heart during the evolutionary stage of tuberculosis has proved unsuccessful and caused death. The patient developed a bacillary meningitis and died from it. Tuberculous lesions were found in the extirpated pericardium.

Patients with a marked passive cardiac deficiency should not be subjected to an operation.

Before the operation an attempt should be made to improve the patient's condition and the cardiac efficiency. Furthermore, serous effusions should be evacuated to prevent, if possible, a new formation of adhesions.

Blood transfusions should be given before the operation if necessary. Either local or general anesthesia, with cyclopropane or ether given through a tracheal tube, can be used. Any approach with which the surgeon is familiar may be used. Extirpation of the pericardium should be as ample as possible. Total pericardiectomy is not always possible on account of firm adhesions which are likely to exist in certain zones between the heart and the pericardium. In such cases, which are relatively frequent, a partial pericardiectomy must be performed. Experience has shown that many patients have fully recovered after partial extirpation of the pericardium.

The authors obtained a cure in 37 per cent of their material. This figure compares favorably with that of other authors who show cures in from 22 to 36.6 per cent of their cases.

JOSEPH K. NARAT, M.D.

Shallard, B.: Patent Ductus Arteriosus. *Med. J. Australia*, 1945, 2: 353.

The prognosis in patients with patent ductus arteriosus is poor, apart from surgical treatment. Shallard reports in detail the cases of 14 patients on whom operations were performed. Four succumbed to operation, 2 from hemorrhage and 2 from other causes, and 1 died from subsequent infective endocarditis.

In discussing the diagnosis, it was thought that there is not one clinical sign which alone can be depended upon as being constant. The murmur described as continuous machinery, water-wheel, train-in-tunnel, may not always be found. In 2 of the patients the murmur at the initial examination was limited strictly to systole. The diastolic component developed during a period of observation of 6 months in one patient and during a period of 3 years in another.

X-ray pictures are invaluable in diagnosis, but are not pathognomonic. Dilatation of the pulmonary artery was present in only two-thirds of the cases. Left ventricular hypertrophy was found radiologically, and a deviation occurred in the electrocardiograms in 4 cases. Significant changes in the S-T intervals in two readings were observed.

Pallor, a clinical sign not hitherto described, is considered important, and anginal pain on effort was reported by 2 adult patients. These symptoms are unusual in patent ductus arteriosus.

STEPHEN A. ZIEMAN, M.D.

Paton, C. N.: Anesthesia in Cases of Ligation of Patent Ductus Arteriosus. *Med. J. Australia*, 1945, 2: 362.

Basal narcosis with avertin, followed by inhalation anesthesia with cyclopropane, was found to be a satisfactory form of anesthesia in a series of cases of ligation of a patent ductus arteriosus.

Cyclopropane was selected because of its nontoxic and nonirritating features, the shallow type of respiration it produces, the ease with which "controlled respiration" can be instituted, the high concentration of oxygen in which it is administered, and its reversibility. A standard McKesson machine was used which facilitated the application of accurately measured positive pressure.

Endotracheal intubation was an added advantage because a minimum of disturbance of cardiac and respiratory function was experienced. Complications either during or after operation were surprisingly few.

STEPHEN A. ZIEMAN, M.D.

Edye, B. T.: The Surgical Treatment of Patent Ductus Arteriosus. *Med. J. Australia*, 1945, 2: 362.

Edye describes the procedure he employs in the surgical treatment of patent ductus arteriosus. He approaches the pathological conditions through a planned space, verified by skiagram to be opposite the second left intercostal area. An oblique incision over this intercostal space was made, coursing upwards and outwards in the direction of the fibers of the pectoralis major muscle from the margin of the sternum to the line of the anterior axillary fold. The muscle was split and not divided. In the older patients a curved incision was made with the convexity upwards to avoid the mammary tissue. The pleural cavity was entered by incision of the intercostal muscles and pleura, and the cartilages of the second and third ribs were divided. The internal mammary artery was sometimes divided between ligatures, but at other times the incision stopped short of it. If it was injured, it caused troublesome hemorrhage and delay. A rib spreader was inserted over gauze sponges and the wound was widely opened. A light gauze pack was inserted to protect the collapsed lung. The diagnosis was confirmed by the characteristic thrill detected on palpation at or near the site of the ductus. Usually the anatomical structures, including the phrenic and vagus nerves and the left subclavian artery, were clearly visible. The ductus joins the aortic arch at or just beyond the level of the origin of the latter. This preliminary examination completed, the mediastinal pleura was divided vertically between the 2 nerves. The posterior leaf was raised to bring into view the recurrent nerve which hooks around the aorta immediately to the left of the ductus, and is a most important guide to the latter. The ductus was also located by making pressure over the interval between the aortic arch and the pulmonary artery at various points until the thrill was obliterated.

The dissection of the ductus was a tedious process, fraught with considerate anxiety, for its wall was apt to be delicate and easily torn. The interval between the aortic arch and the pulmonary artery was gently widened by blunt dissection with long curved forceps a little distance to the right of the ductus, and the process was repeated closer to the ductus until that aspect was freed. A similar dissection was carried out on the opposite side, the left recurrent laryngeal nerve being used as a guide. The forceps was then insinuated posteriorly so as gradu-

ally to open the interval between the ductus and the left bronchus behind. It was during this stage of the dissection that the ductus was apt to be torn. The maneuver was assisted by counter pressure with the left index finger in the interval between the aortic arch and the pulmonary artery, to the right of the ductus. Narrow malleable copper retractors were a useful aid in the exposure of the ductus.

The next step was the passage of a MacCormick dissector behind the ductus, aided as before by counter pressure with the left index finger; care had to be taken not to catch the posterior aspect of the ductus with the instrument. When the dissector had been passed, no attempt was made as a rule to free the ductus any further posteriorly, but the dissector, now loaded with number 8 silk, was passed and the ligature was drawn through. The ligature slipped through with greater ease when the dissector was *in situ*. A second ligature was passed. At or about this stage the ductus was compressed digitally and the effect on the circulation was noted. If after 1 or 2 minutes there were no untoward effects, the ligatures were carefully but firmly tied. By palpation and by auscultation with a sterilized stethoscope, it was determined that the thrill and murmur had disappeared. The incision in the mediastinal pleura was sutured as well as possible. Any blood was aspirated from the pleural cavity and the chest wall was closed in layers. The divided costal cartilages sometimes were and sometimes were not sutured with catgut. The ribs were drawn together with sharp hooks during the closure of the pleural cavity, and the lung was encouraged to expand by the anesthetist and also by suction of air from the pleural cavity before final closure. No drainage was provided; convalescence was usually uneventful, and only on occasion was it necessary to aspirate pleural fluid. The blood transfusion was continued slowly throughout the operation.

It must be remembered that when cardiac efficiency has been impaired, it is possible the introduction of a large amount of blood may be detrimental.

STEPHEN A. ZIEMAN, M.D.

Gross, R. E.: Surgical Relief for Tracheal Obstruction from a Vascular Ring. *N. England J. M.*, 1945, 233: 586.

In an infant with symptoms of tracheal obstruction (crowing inspiration, dyspnea, intercostal and suprasternal respiratory retraction) there developed attacks of superimposed tracheitis, for which the patient was hospitalized on 4 different occasions. Fluoroscopic studies made after the patient had a swallow of barium showed what appeared to be a mass lying behind the esophagus, opposite the third and fourth thoracic vertebra, with the esophagus itself pushed forward and narrowed in both the anteroposterior and lateral views. Instillation of lipiodol showed a fairly marked narrowing of the trachea just above its bifurcation, at a level corresponding with the previously described esophageal deformity. This narrowing was apparent in the anteroposterior view and was particularly noticeable in the lateral film.

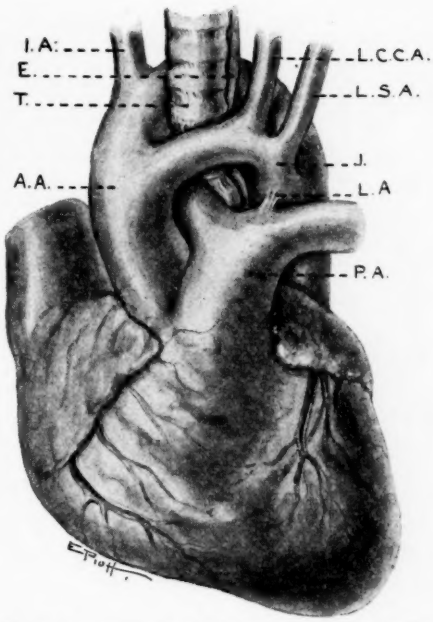

Fig. 1. Arrangements of the great vessels as found at operation. The ascending aorta bifurcates into two branches; one passes behind the esophagus and the other arches in front of the trachea. The two branches join to form the descending aorta. Within the vascular ring the esophagus and trachea are compressed. AA—ascending aorta; E—esophagus; IA—innominate artery; J—junction of the two aortic arches; LA—ligamentum arteriosum; LCCA—left common carotid artery; LSA—left subclavian artery; PA—pulmonary artery, and T—trachea.

Operation was then performed at once, although the patient was in a precarious state at the time. Under cyclopropane anesthesia the chest was opened through a left anterolateral incision, and the pleural cavity was entered through the third interspace with separation of the third and fourth costal cartilages. The left pleural cavity was traversed to reach the mediastinal structures. When the mediastinal pleura was opened the aorta was seen to divide into two vessels which enclosed and greatly constricted the esophagus and trachea and then joined to form the descending aorta. The left common carotid and left subclavian arteries came off the smaller anterior segment of the ring in the usual manner for the aortic arch, and the much larger posterior segment gave issue to the innominate artery.

First the ligamentum arteriosum was divided between silk ligatures to allow the pulmonary artery to fall forward and away from the trachea; this procedure did not have a marked beneficial effect on the

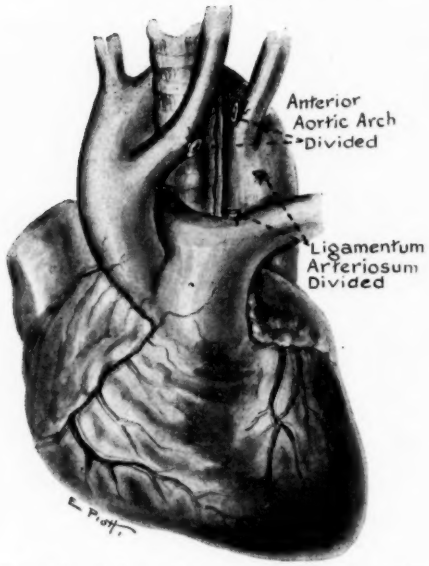

Fig. 2. Surgical procedure. The ligamentum arteriosum was divided to allow the pulmonary artery to displace forward. The anterior arch of the aorta was divided to relieve compression of the trachea.

respiratory exchange, and the anterior segment of the ring was then divided between the two branches which were described.

As soon as the anterior aortic arch had been divided the respirations quieted down, most of the crowing disappeared, and the respiratory shift in the mediastinum diminished to a normal degree. The chest wall was closed in an appropriate manner, the left lung being completely expanded before final repair of the wound, and the patient was placed in a steam room and given sulfadiazine and penicillin parenterally.

After 1 week, the patient was alert and playful and had no distress of any kind. When the ear was held close to the chest a faint inspiratory sound could be heard; during and immediately following deglutition of food these inspiratory sounds became slightly louder, apparently because the esophagus was still displaced forward by the aortic arch behind it and was causing some pressure on the posterior wall of the trachea.

Roentgenographic examinations 1 month later showed no change in the esophagus, and the trachea still presented some narrowing above its bifurcation, but this was distinctly less marked. Although its left border had straightened out considerably, there was some indentation along its right side, perhaps due to some residual pressure from the left common carotid artery which was now passing across the trachea from in front, or due to incomplete development of the tracheal ring following the longstanding external pressure.

Vascular rings of this nature do not always give rise to important clinical symptoms, but when the compression of the trachea is great enough to give rise to respiratory distress, surgical division of some portion of the ring should offer an excellent chance for relief of the symptoms.

JOHN W. BRENNAN, M.D.

ESOPHAGUS AND MEDIASTINUM

Lam, C. R.: Surgical Treatment of Congenital Atresia of the Esophagus. *J. Pediat.*, S. Louis, 1945, 27: 456.

Until Leven, in 1939, reported that a child had survived the serious preliminary operations of a multiple stage procedure for congenital atresia of the esophagus, and that if an antethoracic skin tube could be constructed the case could be called successful, the outlook for the child born with an obstructive defect in the esophagus was hopeless.

The indirect method, however, had many disadvantages, and it soon gave way to the operation of direct anastomosis.

Esophageal atresias may be classified as follows: type 1, in which there is complete absence of the esophagus (rare); type 2, in which there is an upper and a lower segment ending in blind pouches (also rare); type 3, in which one or both of the segments communicate with the trachea or bronchus. Type 3 is subdivided into type 3a, in which the fistula is between the upper segment and the trachea, type 3b, in which the fistula is between the lower segment and the trachea, and type 3c, in which both segments communicate. Type 3b is encountered more frequently than all other types combined and accounts for from 80 to 90 per cent of all congenital atresias of the esophagus.

If a newborn infant has a tendency to choke on his own mucus or is unable to take feedings, suitable roentgen studies should be carried out and if a congenital lesion is present, its type can be determined with considerable certainty.

For a successful operation, three objectives are in order: (1) provision must be made for feeding the infant; (2) regurgitation from the stomach through the lower segment into the trachea and bronchial tree must be prevented; (3) the blind pouch of the upper segment must be opened to allow the escape of swallowed saliva. These requirements would be met by gastrostomy, ligation of the lower esophageal segment, and marsupialization of the upper pouch. With these three procedures completed, the situation would be compatible with life, but permanent gastrostomy feedings would be necessary unless an antethoracic esophagus could be constructed. On the other hand, the operation of direct anastomosis meets at once all the essentials for the establishment of normal functional and anatomic conditions.

Most or all of the operation is performed under local anesthesia. A transfusion of approximately 75

c.c. of blood is given through a cannula inserted in an ankle vein. Access to the posterior mediastinum is gained by exposure of the vertebral ends of the second through the sixth ribs, subperiosteal resection of short lengths of these ribs, section of the third, fourth, and fifth intercostal bundles, and careful reflection of the parietal pleura from the vertebral column. It is necessary to ligate the azygos vein on the right, or the upper two or three intercostal arteries on the left, to open up the space behind the trachea where search will be made for the distal segment. The upper segment is identified by the palpation of a catheter which has been introduced through the mouth. The lower segment is then located and ligated as close to the trachea as possible. It is cut transversely distal to the ligature and a corresponding opening is made in the blind upper segment. End-to-end anastomosis is performed over a catheter, and with the use of fine silk in dural or eye needles. If no distal segment can be found or if, after ligation, the segment is too short to be connected with the upper one, resort to an indirect method is made.

Immediate postoperative care consists in an oxygen tent incubator, extreme vigilance in the aspiration of secretions from the pharynx, and nothing by mouth for 5 days, parenteral fluids being administered by hypodermoclysis. On the fifth day, if inspection of the dressing shows no leakage of mucus from the wound, cautious feeding by mouth is begun. One-half ounce of 5 per cent dextrose solution is offered every two hours. If there is no regurgitation or evidence that the anastomosis is not intact, this amount is gradually increased to 2 ounces. On the seventh postoperative day, 1 ounce of formula is given every 2 hours. If this is tolerated, all restrictions on the feeding of formula are removed after the tenth day. Vomiting should be avoided for it would undoubtedly put strain on the anastomosis. STEPHEN A. ZIEMAN, M.D.

Scott, W. J. M.: Idiopathic Dilatation of the Esophagus. *Ann. Surg.*, 1945, 122: 582.

Today it is recognized that dilatation of the esophagus without obvious pathological cause is a common condition. In fact, it is approximately one-third as frequent as carcinoma of the esophagus, being second only to the latter in the statistics of the larger clinics (MacMillan). It appeared earlier in the literature under the purely descriptive term, ectasia or idiopathic dilatation of the esophagus. But today the author's etiological conception is usually introduced into the name, and the condition is most commonly designated as achalasia of the cardia or cardiospasm, although there are still widely conflicting opinions about the cause of the dilatation.

Fortunately for the patients who suffer from this serious, and usually progressive, difficulty in the passage of food from the dilated esophagus into the stomach, treatment does not need to wait for a final determination of the cause; by dilatation of the cardia, either on one or repeated occasions, the symptoms in the majority of cases are adequately controlled. However, some of these patients do not respond satisfactorily to this and the other conservative measures of treatment. Although the percentage of this refractory group is small, the failure to respond to conservative measures offers a serious problem for two reasons: first, because of the complete failure of the usual therapeutic measures to alleviate the condition; and, second, because of the progressive seriousness of the symptoms. These cases constitute a small but important group, and their relief has become a challenge to the general surgeon as well as to the esophagoscopist.

Dilatation of the esophagus without any clinically discoverable obstruction is not a disease entity but a syndrome. At least four clinical types can be recognized, each with a different etiology; namely, (1) achalasia of the esophagus, (2) true cardiospasm, (3) partial constriction near the cardia, and (4) dolichoesophagus.

Achalasia is probably the most common type. It usually responds well to dilatation. In true cardiospasm the reflex originating focus should be discovered and removed. Those cases caused by a partial constricting band near the cardia are few in number but are probably resistant to conservative treatment. Dolichoesophagus, an S-shaped lengthening with pooling of esophageal contents at different levels, should probably be operated upon immediately on recognition. This type is very difficult to control when the dilatation becomes gigantic and is complicated by infection of the esophageal wall.

Subdiaphragmatic esophagogastrostomy of the Finney pyloroplasty type appears to be the operation of choice in the cases of idiopathic dilatation of the esophagus that are resistant to the usual conservative measures. The symptomatic results of this operation are usually excellent whether or not the dilatation of the esophagus is entirely corrected. The danger of the operation is not excessive when proper precautions are taken. After this operation has been employed more extensively, the number of cases in which it is indicated will probably be considered as having increased, but it should never replace conservative dilatation in the majority of cases. JOHN E. KIRKPATRICK, M.D.

Olsen, A. M., O'Leary, P. A., and Kirklin, B. R.: Esophageal Lesions Associated with Acrosclerosis and Scleroderma. *Arch. Int. M.*, 1945, 76: 189.

Approximately 10 per cent of the patients suffering from acrosclerosis or scleroderma made complaints referable to the esophagus. The most common complaint was dysphagia. Frequently there was also substernal burning after meals, especially when the patient was lying down.

Positive roentgenographic or endoscopic findings were demonstrated in 18 cases. Dilatation of the esophagus similar to that seen in cardiospasm was

observed in 7 cases and hiatal hernia with intrathoracic stomach was demonstrated in 9 cases. In 2 other cases sclerodermic changes were demonstrated in the esophageal wall.

Acrosclerosis should be distinguished from other forms of scleroderma. In acrosclerosis the phenomena of Raynaud's disease are present prior to the dermatological changes or coincident with them. Thirty-three of the 36 patients who had esophageal symptoms presented the clinical syndrome of acrosclerosis. All of the 18 patients who had positive roentgenographic or endoscopic findings had acrosclerosis.

The basic alteration in acrosclerosis and scleroderma is sclerosis of the connective tissues of the body. Sclerodermic changes in the connective tissues of the esophagus are chiefly responsible for the esophageal disturbances. It should be emphasized that esophageal disturbances are extremely uncommon in Raynaud's disease per se. Reduced or absent muscular activity in the wall of the esophagus and shortening of the esophagus apparently result from sclerodermic involvement. Disturbances of the autonomic nervous system may play some part in the causation. Clinical diagnoses of cardiospasm and hiatal hernia of the short esophagus type are made most frequently in these cases. Stenosis of the lower part of the esophagus and the esophagogastric junction may occur with hiatal hernia as the result of chronic inflammation of the lower part of the esophagus. This inflammation is the result of incompetence of the cardiac sphincter with regurgitation of the gastric secretions.

The treatment of the esophageal lesions of acrosclerosis consists of the passage of sounds over a previously swallowed thread. Fairly satisfactory results have been obtained. The esophageal stenosis of 1 of these patients was treated satisfactorily over a 16 year period by repeated dilatations.

Clark, D. E., and Adams, W. E.: Transthoracic Esophagogastrostomy for Benign Strictures of the Lower Esophagus. *Ann. Surg.*, 1945, 122: 942.

Clark and Adams report in detail 5 cases of transthoracic esophagogastrostomy for benign stricture of the lower esophagus. None of the 5 patients was considered to have cardiospasm. In 1 case the stricture followed the ingestion of lye, in another it was associated with generalized scleroderma, and in 3 cases there was no etiological factor that could be ascertained. In all of the cases, however, the obstruction either started above the diaphragm, or the entire lesion was in the thorax, so that transabdominal cardioplasty was out of the question.

Four of the patients had repeated dilatations with only temporary relief, and 2 of these required gastrostomies when dilatations became impossible. The fifth patient, because a malignancy of the cardia was suspected, was not subjected to dilatation.

Employing positive pressure ethylene-oxygen-ether anesthesia, the authors opened the chest through the eighth rib bed in 4 cases, and through the eighth interspace in 1 case. After proper retractions of the lung, and excision of the phrenic nerve, the diaphragm was incised from the periphery toward the esophageal hiatus. The spleen was removed to facilitate mobilization of the stomach and the fundus was brought up into the thorax to the arch of the aorta. The anastomosis spot was selected just above or at the upper level of the stricture and side to side anastomosis was made. The diaphragm was closed about the stomach and sutured to its wall. The wound was closed tightly.

All of the patients made an uneventful recovery, and are still alive and enjoying a normal existence.

It is concluded from these selected cases of benign stricture of the lower esophagus that transthoracic esophagogastrostomy offers the patient complete relief without the necessity of dilatation or the unpleasantness of the gastrostomy.

STEPHEN A. ZIEMAN, M.D.

MISCELLANEOUS

Donovan, E. J.: Congenital Diaphragmatic Hernia. *Ann. Surg.*, 1945, 122: 569.

In reviewing the literature of the past 10 years on congenital diaphragmatic hernia, one is impressed by the number of single cases reported by various authors as well as by the series of cases reported by Harrington, Ladd and Gross, and Hartzell, and Truesdel. Many of the infants were operated upon successfully at an early age. It is obvious from these reports that the diagnosis is made much earlier and that operative treatment has made great progress in recent years. In 1925, Hedblom reported that 75 per cent of the infants with congenital hernia die before they are 1 month old. In 1938, the author reported 10 cases from the Babies' Hospital, New York, 6 of which had been operated upon. The purpose of this article is to review the surgically treated cases of the first series, add to their follow up, and report 11 additional cases operated upon since 1938.

The most common congenital defects in the diaphragm are, in order of their occurrence: (1) esophageal hiatus, (2) foramen of Bochdalek, (3) foramen of Morgagni, and (4) defects in the dome. Hernias through the vena caval or aortic openings in the diaphragm have never been reported.

The symptoms of diaphragmatic hernia may be either circulatory, respiratory, gastrointestinal, or a combination of all three. They are due to mechanical interference with the function of the herniated structures or to interference with respiratory or circulatory organs upon which the herniated structures encroach. In most of the cases of hernia through the foramen of Bochdalek, the usual finding is that the chest is full of intestines, both large and small, often accompanied by part of the stomach and quite frequently by the spleen and kidney.

Surgical repair of the hernia should be advised immediately for all cases in which either the small or large intestine is in the chest because of the danger of intestinal obstruction. The author prefers the

abdominal approach through a subcostal incision, with exposure of the phrenic nerve in the neck 48 hours before repair. Many surgeons prefer the thoracic approach. As a rule, there are no adhesions in the chest and the structures are easily reduced if the operator places a retractor in the diaphragmatic defect and equalizes the pressure in the chest and abdomen before he tries to reduce the structures.

In 3 cases of this series there was a large opening with no attachment of the diaphragm to the posterior chest—these were probably cases of deficiency of the diaphragm. In these cases a row of silk sutures was used with two needles on each; they were passed through the diaphragm to the outside of the chest wall, one on either side of the adjacent rib, and tied over a piece of gauze. Because of the deficiency of reparative material in these cases, the row of sutures attached the diaphragm at a higher level in the chest than normal in closing the defect. A second row of continuous or interrupted silk sutures were then used to attach the edge of the diaphragm to the pleura and intercostal muscle. In any type of closure a catheter is placed in the chest and the air is removed before the last suture is tied.

Positive pressure or intratracheal anesthesia are very desirable. All patients should be kept in an oxygen tent for several days after operation. Pleural effusion may occur, and aspiration should be done as necessary. JOHN E. KIRKPATRICK, M.D.

Grez, A.: Two Cases of Mediastinitis Caused by Perforation of the Esophagus and Treatment with Penicillin. Recovery. (Dos casos de mediastinitis por perforacion esofagica Tratadas con penicilina. Curacion). *Rev. med. Chile*, 1945, 73: 979; Rev. otorrinolaringol., 1945, 5:115.

The customary treatment of mediastinitis caused by perforation of the esophagus consists of mediastinotomy, especially if the perforation is located in the upper esophagus, while a partial resection may be indicated in grave cases.

A perforation of the esophagus may be due to a voluminous foreign body or one with irregular surfaces or sharp points. In other cases a cancer or an ulcer of the esophagus may lead to a perforation or the latter may be due to a traumatism in the course of esphagoscopy. A violent spasm provoked by an attempt to extract a large foreign body through an esophagoscope may be followed by a perforation.

If a perforation occurs in the cervical portion of the esophagus, pain develops at the base of the neck and a subcutaneous emphysema appears. If the perforation involves the thoracic portion of the esophagus, the pain is confined chiefly to the region between the scapulae, and the respiratory movements become shallow because deep respiration causes pain. If the perforation occurs in the distal portion of the esophagus, the pain is confined mostly to the epigastric region. Anxiety, pallor of the skin and visible mucous membranes, frequent pulse, the presence of anaerobic bacteria in the sputum, and fever are other important signs.

The author treated an 18 year old girl who developed dysphagia following the ingestion of 10 c.c. of nitric acid. Two months later roentgenograms showed a cicatricial stenosis of the esophagus of caustic origin. The entire esophagus was rigid and stenosed. On esophagoscopic examination a stenosis was encountered at the upper aperture, and sounds, from size 12 to 18, were introduced through Jackson's tube. The patient's condition improved but she returned 9 months later with intensive dysphagia. Sounds from size 12 to 14 would pass only the upper portion of the esophagus and roentgenographic studies confirmed the diagnosis of a high stricture. Dilatations of the esophagus were continued for 11 days. Two weeks later the patient returned with a more intensive dysphagia and edema and pains in the left side of her chest. The pains were radiating toward the left upper extremity and the left side of the spine. Gastrostomy was planned in order to facilitate alimentation. X-ray studies revealed a homogeneous, sharply circumscribed shadow in the upper mediastinum, especially on the left side. The esophagus in that region had irregular outlines and a retention of barium was noticed 24 hours after its ingestion. The roentgenological diagnosis was mediastinal abscess of esophageal origin with a suspicion of pulmonary abscess on the left side. Twenty thousand units of penicillin were given every 3 hours in addition to a blood transfusion. The temperature returned to a normal level after 48 hours and the pain disappeared completely after the administration of 1,000,000 units of penicillin. Five days later x-ray studies showed a complete disappearance of the mediastinal lesion; it was believed that this lesion might also have been of tuberculous origin.

The second patient, 33 years of age, had been complaining of epigastric pains and complete dysphagia for 4 years. The attacks used to come in the form of crises during which the patient was not able to swallow even his saliva. Gradually the attacks returned at shorter intervals so that at the time of admission hardly a day was passed without attacks. Roentgenographic studies revealed a contraction of the esophagus at the junction with the cardia. An esophagoscope 7 by 45 could not pass the stenosis. A dysfunction of the diaphragmatic hiatus with a resulting spastic condition of the esophagus was diagnosed and a mercury sound was passed. The procedure was repeated for 4 days. When the esophagoscopic examination was repeated, a contracture was encountered at the cricopharyngeal level. The esophagoscope was withdrawn but in spite of careful technique the patient developed pain in the neck, especially on the left side, frequent pulse, and a rise in temperature. Roentgenographic examination disclosed a sharply circumscribed, homogeneous shadow in the upper mediastinum. The clinical and roentgenological diagnoses were mediastinitis due to a perforation of the esophagus. Thirty thousand units of penicillin were given intramuscularly every 3 hours, in addition to a hypoder-

moclysis of glucose in saline solution. The following day an edema developed in the left lower cervical region and the frequency of respirations rose to 30 per minute. The pain was radiating to the left side of the chest and the left supraclavicular region. Only after 72 hours the fever, pains, dyspnea and other symptoms began to subside, and it disappeared completely 10 days from the time the treatment had been instituted. The total amount of penicillin given was 1,920,000 units. A gastrostomy was performed to facilitate the administration of food and retrograde dilatation.

The author stresses the point that in spite of a large experience of the esophagoscopist and extreme care, fissures of the esophageal wall may follow dilatation of the esophagus. A necrosis of the mucosa gradually leads to the formation of a fistula with resulting mediastinitis. Blood transfusions and the administration of other fluids intravenously should supplement the administration of penicillin in such cases. JOSEPH K. NARAT, M.D.

Forsee, J. H.: The Use and Control of Thoracic Surgical Teams of an Auxiliary Surgical Group. *J. Thorac. Surg.*, 1945, 14: 425.

An auxiliary surgical group composed of a group headquarters, general surgical, orthopedic, neurosurgical, maxillofacial, thoracic surgical, shock, gas, and dental prosthetic teams has been employed in the American Army for the first time during World War II.

This organization under one central control group has produced a maximum level of competence and economy in the deployments of specialized surgical talent. Remarkable advances have been made in thoracic surgery since World War I, and thoracic surgical teams have been used for the first time in this war. The author's study is based on 18 months of experience caring for 2000 patients with thoracic injuries.

Thoracic surgical teams are composed of a thoracic surgeon, an assistant surgeon, an anesthetist, a surgical operating room nurse, and 2 enlisted surgical technicians. The chief surgeon should be a competent operator, preferably with a sound basic training in general surgery, a good teacher, and should have a thorough knowledge of surgical physiology of the thorax. The assistant surgeon should have a minimum of 2 years of surgical training, with some experience in the medical aspects of thoracic diseases. The anesthetist should be expert in endotracheal and positive pressure anesthesia, in bronchoscopic aspiration of secretions, the management of shock, and in the recognition and treatment of disturbed cardiorespiratory physiology. The nurse should be an able instructor in operating room technique, able to teach the principles of asepsis to soldiers without previous experience, and have a knowledge of the technical features of the specialty. All team members should be sincere, have physical stamina, and the ability to adapt themselves to varied and changing situations.

The teams work in many different hospitals and supplement the regular staffs when the requirements for surgery exceed the capacity of the regular staff.

The equipment is minimal and consists of the army basic instrument set, and a supplemental thoracic set including a bronchoscope and accessories. An electric suction apparatus and portable anesthesia equipment complete the list.

The thoracic surgical teams are employed in forward and base section areas. The most severely wounded, those who cannot be transported further to the rear without surgery, are cared for in a platoon of a small field hospital. Ordinarily a field hospital can care for 380 patients, but when used as a first priority mobile surgical hospital, the census must be reduced to about 35. The small staff is supplemented when necessary by the qualified personnel of the surgical teams of an auxilliary surgical group.

It is here that surgical care can be first instituted. These hospitals are located in the rear of a divisional area and in close conjunction with a divisional clearing station. The platoons of a field hospital are capable of moving on short notice and they "leap frog" one another. The platoon, or part of it, is left behind and becomes a "holding unit." When all the patients have been evacuated, in from 2 to 10 days, the unit is available to "leap frog" another platoon and become the forward hospital.

An active platoon requires 4 general surgical, 1 thoracic, and 1 shock team. The thoracic surgical team not only operates, but also advises in the management of thoracic wounds and teaches bronchoscopy to anesthetists and surgeons. The thoracic surgeon's interest in intercostal nerve block, pre- and postoperative thoracentesis, endotracheal and positive pressure anesthesia, pulmonary re-expansion after surgery, catheter aspiration of tracheobronchial secretions, the management of intrathoracic foreign bodies, and traumatic hemothorax has been a stimulus to all surgeons treating severe thoracic wounds.

Certain types of cases which were considered first priority surgical problems, in the light of certain therapeutic measures previously enumerated together with judicious shock management, are now frequently transportable, and immediate surgery is no longer considered necessary. One thoracic surgical team, however, during a period of 7 weeks, operated on 92 intrathoracic conditions, of which 20 were combined thoracoabdominal wounds, 16 were thoracotomies, and 56 were penetrating or perforating injuries. At the same time this group operated on 44 patients with abdominal wounds.

First priority surgical cases represent only 8 per cent of the total cases arriving at the division clearing station. The majority are evacuated to the evacuation hospital a few miles to the rear. The mortality rate in a well run first priority hospital is about 25 per cent, and anything less usually indicates an improper selection of cases.

The overall mortality rate in 346 intra-abdominal wounds (20 per cent of which were combined thor-

acoabdominal wounds) treated by surgeons of this group was 30.6 per cent. Pulmonary complications caused 27 per cent of the deaths, while peritonitis was responsible for only 11.4 per cent. Another series of 226 intrathoracic wounds with 43 per cent thoracoabdominal injuries showed an overall mortality of 28 per cent.

These figures indicate that most patients were wounded with high explosive shells, and that the highest percentage had multiple major wounds. Thoracic surgical teams working at this level must be competent to do major abdominal surgery.

The surgical teams of an auxiliary surgical group have done much to develop the phase of forward surgery. They have exerted a remarkably favorable influence on the morale of combat troops and have eliminated the temptation for clearing and collecting companies to indulge in heroic surgical procedures which they were never designed or equipped to carry out.

The evacuation hospitals, located from 3 to 15 miles to the rear of a first priority surgical hospital, treat 90 per cent of the casualties from the divisional clearing stations. The percentage of abdominal and combined thoracoabdominal injuries treated here is low, but a majority of the penetrating injuries of the thorax are treated here. An appreciable segregation of cases into the surgical specialties is practical. In such 400 or 750 bed installations, thoracic surgical teams have been useful to supplement the regular thoracic surgical section or furnish qualified personnel if no qualified thoracic surgeon is on the regular staff. It is highly desirable to have 2 thoracic surgical teams functioning in an evacuation hospital and devoting their attention to the treatment of patients with major thoracic injuries.

In quiet periods at the front when there is no need for beds for imminent battle casualties, certain surgical procedures such as the removal of intrapulmonary foreign bodies and pulmonary decortication for organizing hemothorax are undertaken.

In fixed installations, station or general hospitals in the base section area, the thoracic surgeons have a real opportunity. Every effort is made to return the patients to duty within 90 days. This policy has led to several noteworthy contributions: the removal of intrapulmonary foreign bodies within 10 days to 3 weeks after injury; the radical management of massive organizing hemothorax by thoracotomy; evacuation of the clot; and decortication of the lung. The same procedure applied to established posttraumatic empyema with penicillin therapy as an adjunct has led to immediate healing with a fully expanded lung. This has been one of the significant advances in the surgery of World War II. To the thoracic surgical teams of an auxiliary surgical group goes much of the credit for these advances.

The use of thoracic surgical teams in fixed installations often has permitted the completion of the reparative phase of surgery by the same surgeons that have dealt with the initial phases of wound management in the forward hospitals.

The organization of a large number of highly trained surgeons into surgical teams under one central control was new and untried several years ago. Few hospitals considered the need for the assistance furnished by such teams. However, today the usefulness of such an organization is fully recognized and appreciated by all who have first hand experience in the problems confronting the medical science of an active theatre of operations.

ROBERT R. BIGELOW, M.D.

SURGERY OF THE ABDOMEN

ABDOMINAL WALL AND PERITONEUM

Brandon, W. J. M.: Inguinal Hernia; The New Muscular Internal Ring. *Lancet*, Lond., 1945, 249: 812.

The author points out that the only common factor in the various types of hernia repair is the retention of the original muscular internal ring. Closure of this ring when the cord and testicle are removed has proved uniformly successful. The conclusion is drawn that the internal ring is the potential source of weakness, and that all recurrent hernias may be shown to involve the internal ring.

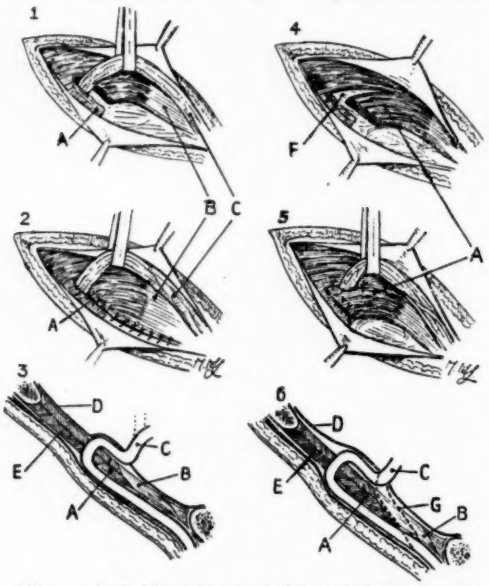

Fig. 1. A, Incision of internal oblique and transversalis muscles; B, conjoined tendon; C, spermatic cord.

Fig. 2. A, Incised muscles reconstituted to form new muscular internal ring; B, entire inguinal canal closed by suture of conjoined tendon to Poupart's ligament.

Fig. 3. A, Portions of internal oblique and transversalis muscles sutured medial to cord; B, sutured conjoined tendon; D, transversalis fascia; E, lateral portion of internal oblique and transversalis muscles.

Fig. 4. A, Internal oblique and transversalis muscles incised; F, muscles separated in the line of their fibres. (Spermatic cord omitted.)

Fig. 5. New muscular internal ring full constructed.

Fig. 6. A, B (sutured conjoined tendon), Anterior blade of shutter giving full protection to true internal ring; C, spermatic cord emerging from new muscular internal ring after taking an S-shaped bend; D, transversalis fascia forming posterior blade of shutter and protecting new muscular internal ring; E, internal oblique and transversalis muscles; G, dotted lines showing path taken by spermatic cord in all well-known posterior repair operations.

A modification of the Bassini repair is described, in which the essential feature is the construction of a new muscular ring. The internal oblique and transversus abdominis muscles are incised so as to form a "V" at the old internal ring. This muscle is then sutured about the cord to form a new ring, as shown in Figs. 1, 2, and 3. A slightly different technique, in which the fibers of the muscles are split at the apex of the "V" to further move the internal ring from its original position, is shown in Figs. 4, 5, and 6. In this way the obliquity of the emergence of the spermatic cord from the abdomen is changed and made more angular. There is then a two bladed "shutter" over the internal ring—one the transversalis fascia, another formed by the new muscular ring, and both permanently closed and not in opposition to one another.

The author concludes that for the moment this new suggestion in the repair of inguinal hernia is a thesis and that proof of its efficacy must await the test of time. THOMAS C. DOUGLASS, M.D.

GASTROINTESTINAL TRACT

Cancino, A.: The Arterial Circulation of the Stomach. Gastric Hemorrhage (Circulación arterial del estómago. Hemorragia gástrica). *Rev. Gastroenter.*, 1945, 10: 91.

The author removed the stomach and the adjoining part of the duodenum from cadavers, preserving all the arteries. Specimens were obtained from fresh cadavers to avoid maceration of the tissues. The main arteries were injected with a radiopaque substance and roentgenograms were taken. In this manner the author studied the distribution of the blood vessels in normal stomachs and in those with peptic ulcers.

He came to the conclusion that there is a perfect equilibrium between the arterial pressures of the main arteries. Various factors collaborate in the regulation of the pressure, velocity, and quantity of the blood passing each branch. One could expect that a peristaltic contraction might produce an anemic zone because of the compression of the blood vessels, but in reality this is not the case. The direction of the main arteries is identical with that of the peristaltic waves, which facilitates the blood flow. Numerous anastomoses also contribute to the maintenance of a continuous blood current.

The diagnosis of the origin and mechanism of a grave gastroduodenal hemorrhage is of paramount importance in the selection of proper treatment, namely, the choice between a pure expectant treatment, active medical therapy, and surgical intervention. The gravity of anemia must be determined by a study of the blood pressure, pulse, blood count, and

the amount of hemoglobin. The determinations of pulse and arterial pressure are of limited value because shock may produce a similar picture. Therefore, the blood count and determination of the amount of hemoglobin are of greater value. A grave hemorrhage in the stage of evolution produces a pulse of gradually increasing frequency and an arterial pressure which gradually falls. On the other hand, shock is followed by a fall of the blood pressure which remains stationary for a time, but gradually returns to normal levels in favorable cases.

A grave hemorrhage causes a progressive diminution of the number of red blood corpuscles. As a rule, an acute hemorrhage responsible for a fall of the number of erythrocytes to 3,000,000 within the first 3 hours gives a very grave prognosis. A red blood count of as little as 1 to 2 million is compatible with life, while in chronic anemias the organism may survive a count even lower than 1,000,000 erythrocytes.

An amount of hemoglobin lower than 30 percent is not compatible with life, and therefore a fall of hemoglobin to between 40 and 50 per cent requires a blood transfusion.

A pulse frequency between 130 and 150 gives a serious prognosis and a systolic pressure between 80 and 90 is also alarming.

While laboratory examinations furnish information as to the gravity of symptoms, clinical examination should attempt to establish the cause of hemorrhages. It must be remembered that various conditions may be responsible for a gastroduodenal hemorrhage, e.g., ulcers, hemophilia, gastric varicosities, venous hypertension caused by a cirrhosis of the liver, blood dyscrasias caused by cholelithiasis, primary or secondary gastric hemorrhage produced by Banti's disease, syphilis of the stomach, cancer, and congestion within the stomach wall caused by retention due to pyloric stenosis.

Hemorrhages from capillaries or precapillaries are benign, as a rule, while those from larger blood vessels require a surgical hemostasis.

If conservative treatment is decided upon, an icebag should be placed in the dorsolumbar region, and not over the epigastrium, because the vasoconstricting reflex of neurogenic origin can be stimulated easier in this manner. Liquids should be given hypodermically in preference to their intravenous administration in order to avoid an overloading of the circulatory system. The amount given depends on the quantity of lost blood, the condition of the pulse, and the blood pressure. The amount of blood to be transfused also should be related to the amount of blood lost.

In chronic anemia a relatively small amount of transfused blood may raise the blood pressure, but this is not the case in patients with an acute hemorrhage who tolerate large amounts of blood without a rise in their blood pressure. A few days may elapse before the blood pressure returns to normal limits after a transfusion of relatively large amounts of blood. A patient with 3,000,000 erythrocytes, a hemoglobin of 60 per cent, and a systolic pressure of 100 requires larger amounts than 400 c.c. of blood.

Vitamin K should be administered intravenously in sufficient amounts. The oral administration of bismuth is to be condemned because the drug has no local hemostatic effect and may provoke vomiting.

No food whatsoever should be given during the acute hemorrhage, but after the bleeding has stopped spontaneously or under the influence of treatment, liquids, and later on the white of an egg, gelatin, and chopped meat may be offered.

An internist should treat the patient with acute gastric hemorrhage until the etiology of the condition has been established. The cause of hemorrhage is the determining factor in the choice of definite treatment.

The roentgenological studies of the gastric arteries convinced the author that an efficient hemostasis requires extirpation of the source of the hemorrhage. JOSEPH K. NARAT, M.D.

Dragstedt, L. R.: Vagotomy for Gastroduodenal Ulcer. *Ann. Surg.*, 1945, 122: 973.

In this communication the author reports the present status of section of both vagus nerves in the treatment of peptic ulcer. The operation was undertaken because of the conjecture, arrived at by experimental work on the lower animals, that pure gastric juice as secreted by the fundus of the stomach has the capacity to destroy and digest various living tissues, including the wall of the jejunum, duodenum, and even the stomach itself. The chief secretory abnormality in ulcer patients lies not in the production of a juice with higher than normal acidity, nor even in the production of more normal juice in response to the usual stimuli, although there is some evidence that this occurs, but rather in the secretion of abnormally large amounts of gastric juice in the intervals between meals, particularly at night when the stomach is empty and there is no obvious stimulant.

Through animal experimentation it was found that section of the vagus nerves to the stomach reduced the secretion of gastric juice in dogs to one-half or even one-fourth of the normal level. The data obtained so far suggest that the hypersecretion of gastric juice in ulcer patients is neurogenic in origin and that, consequently, a comparatively greater reduction should follow vagus section in man than in lower animals.

In all, the author and his associates have operated upon 39 patients with peptic ulcer by sectioning the vagus nerves. The transthoracic approach by resection of the seventh or eighth rib is preferred to the abdominal approach, although the latter has been used in 7 cases.

Postoperatively, the author employed the insulin test to determine if all the vagus secretory fibers to the stomach were interrupted. The rationale of the test lies in the fact that hypoglycemia induced by an adequate dose of insulin stimulates the vagus secretory fibers to the stomach, probably by an effect on

the central nervous system. No effect whatever occurs if the vagus section has been complete.

Of the 39 patients subjected to the operation at the time of this report, 1 died. This patient developed postoperative bronchopneumonia. Thirty of the patients in this series had duodenal ulcers, 2 had gastric ulcers, and 7 had gastrojejunal ulcers. Eight of those with duodenal ulcer were subjected to gastroenterostomy in addition to the vagus section because of high grade pyloric stenosis. In most of the cases of this type the vagus section was done by the abdominal approach at the same time as the gastroenterostomy. Only 1 of the patients with duodenal ulcer failed to obtain striking and persistent relief from his symptoms, and in this case there were many features suggesting a neurosis. The first group of patients have been followed up for 2½ years and, so far, have remained well on unrestricted diets and without medication. For the remainder of the patients a longer period of observation is required before conclusions can be drawn, especially in the cases of gastrojejunal ulcer.

The operation has no effect on the secretory response of the stomach to histamine or caffeine but abolishes the stimulating effect of insulin hypoglycemia and a sham meal. Vagotomy reduced gastric secretion in the empty stomach at night from 50 to 60 per cent. It also resulted in the reduction of hypertonicity, but the tonus and motility of the stomach were not abolished. An interesting observation was the fact that patients who complained of constipation before the operation were relieved of this disturbance. Further study of this effect is necessary. HAROLD LAUFMAN, M.D.

Riera, M., and Diaz, F.: Low or Infrabulbar Duodenal Stenosis (Estenosis duodenales bajas o infrabulbares). *Rev. med. Chile.* 1945, 73: 855.

In the majority of cases of duodenal stenosis the narrowing is located in the bulb and caused by a peptic ulcer. Roentgenograms show a pyloric stenosis with a secondary dilatation of the stomach. Stenosis in the lower segments of the duodenum is rare and may be due to various factors. As a rule, roentgenological studies allow a correct diagnosis and often throw light on the nature of the lesion.

An infrabulbar duodenal stenosis may be congenital or acquired and of intrinsic or extrinsic origin. A congenital stenosis is usually caused by a malformation. Complete duodenal atresia is incompatible with life. A ring of atrophic pancreatic tissue may cause a compression of the duodenum. In such cases a concentric stenosis of the second portion of the duodenum with smooth borders is seen in the roentgenograms. A diverticulum may produce a duodenal stenosis, especially when it is filled with food. In this respect the condition may be compared with stenosis of the esophagus caused by a distended Zenker's diverticulum.

A spastic condition must be taken into consideration in an acquired duodenal stenosis. Such spasms may be caused by a stone impacted in the common duct. Roentgenograms are essential for the diagnosis in such cases. Tumors of the duodenal wall or an extrabulbar peptic ulcer may produce a stenosis of the duodenum. A cancer of the duodenum responsible for a stenosis has been reported. In the majority of cases an infrabulbar stenosis is due to an extrinsic lesion. The second portion of the duodenum may be compressed by the middle colic artery if ptosis of the right portion of the colon changes the normal position of the blood vessel. The root of the mesentery may compress the duodenum in patients with an intestinal ptosis or a short mesentery. In such cases the duodenum is compressed between the spinal column and the mesentery. There is also an acute type of arteriomesenteric stenosis, the mechanism of which is still under discussion.

An extrinsic infrabulbar stenosis may be caused by a tumor in one of the adjoining organs, either by compression or infiltration of the duodenal wall. Tumors of the gall bladder, pancreas, liver, or the left kidney may cause a compression of the duodenum. Acute hemorrhagic pancreatitis may be followed by an enormous increase in the volume of the organ, with compression of the duodenum.

Mesenteric lymph glands, enlarged on account of Hodgkin's disease, leucemia, or lymphosarcoma may produce infrabulbar compression of the duodenum. An aneurysm of the aorta may also be responsible for such a compression. Periduodenal adhesions, periocholecystitis, plastic postoperative peritonitis, or congenital bands may cause a compression of the infrabulbar portion of the duodenum.

Roentgenographic studies reveal a dilatation of the duodenum above the stenosis and an abnormally long retention of the ingested barium. A vigorous palpation of the involved region may provoke antiperistaltic waves and in the presence of pyloric insufficiency a reflux into the stomach may be observed. An obliteration of the mucosal folds is typical for the distention above the stenosis. If the stenosis is not complete, irregular contours of the duodenum may be noticed in the roentgenograms. Introduction of an opaque substance through a duodenal sound may prove useful. Pendulous movements of the normal duodenum may be confusing and therefore repeated examinations are desirable. A supernumerary duodenal loop in the second portion of the duodenum may also create confusing images.

The authors report 11 cases of infrabulbar duodenal stenosis, 5 in men and 6 in women. In 9 it was possible to establish a definite etiology while in 2 the cause remained doubtful. The ages of the male patients ranged from 22 to 42 years and of the female, from 40 to 78 years. JOSEPH K. NARAT, M.D.

Houot, A., Five Cases of Cholecystoduodenostomy (A propos de Cinq cas de cholécystoduodénostomie). *Union med. Canada*, 1946, 75: 24.

As a rule, cholecystogastrostomy is preferred to cholecystoduodenostomy although it is a less physiological method. If technical difficulties are encoun-

tered, occasionally a cholecystojejunostomy is performed, although it is the least satisfactory method.

In the course of 10 years the author performed 5 cholecystoduodenostomies and only 2 cholecystogastrostomies. Usually these operations are done on account of bile fistulas with great loss of bile, or on account of retention icterus. The last mentioned indication was present in 4 patients in the author's material. All of them had a cancer with numerous metastases in close vicinity to the primary tumor and at distant places. In 2 patients jaundice was due to carcinoma of Vater's papilla, in 1 patient it was due to a cancer of the pancreas, and in a fourth it was due to a malignant tumor of the common duct.

In 4 cases the anastomosis was employed as a palliative measure, to limit bile drainage, to suppress jaundice, and to create in the patients the impression that they were cured. The patients survived the operation 14 months, 3 months, and 1½ months, respectively, while the fourth patient succumbed to a bronchopneumonia on the eighth postoperative day.

As a rule, patients undergoing cholecystoduodenostomy are undernourished and icteric, and suffer from pruritus which interferes with their sleep. Small and frequent meals of easily digestible food are prescribed. The preparation of the patient for the operation should not exceed from 8 to 20 days, and therefore oral feedings are supplemented by the subcutaneous administration of 5 per cent glucose solution, 500 c.c. in 24 hours, with the addition of from 10 to 30 units of insulin. The fact should be remembered that such individuals easily develop a hypoglycemic crisis.

In view of the fact that the majority of patients requiring this type of an operation are cachectic and have hypotension, a daily injection of from 4 to 6 c.c. of adrenal cortex extract, divided in two doses, is given. The author avoids ephedrine on account of the resulting insomnia. However, in the course of the operation an injection of 2 c.c. of ephedrine with 5 c.c. of adrenal cortex extract is given. From 6 to 10 c.c. of this extract are administered daily for the first 3 days following the operation and lesser amounts are given thereafter until the patient is able to get out of bed.

A hypnotic is given to provide sleep. As a rule, the hypnotic is combined with 10 drops of a mixture of equal amounts of tincture of belladonna and tincture of crataegus, to intensify the action of the barbiturates.

To diminish the hemorrhagic tendency of icteric patients, from 10 to 20 c.c. of a 10 per cent calcium chloride solution are given intravenously every day for 4 days preceding the operation.

No food is given by mouth the first 48 hours following the operation and during that time 1,000 c.c. of normal saline solution, from 30 to 40 c.c. of a 10 per cent saline solution, and from 1,000 to 1,500 c.c. of glucose solution with 20 to 40 units of insulin are given when necessary.

Except in 1 case, the author employed local anesthesia combined with a basal anesthetic. The anesthetic given per rectum consisted of chloral (4 gm.), potassium bromide (4 gm.), 1 yolk of an egg, and milk q.s. ad. 200 c.c. for local anesthesia. The author used from 60 to 80 c.c. of a 1 per cent solution of novocaine, without the addition of adrenalin because the latter produces a temporary hemostasis, followed toward the end of the intervention by a reflex vasodilatation and oozing. After the peritoneal cavity has been opened, a mesocysticoduodenocolic anesthesia is obtained with a 0.5 per cent novocaine solution.

After the bile has been aspirated from the gall bladder, the organ is united with the second portion of the duodenum. Sometimes it is necessary to separate the gall bladder from the lower aspect of the liver. Catgut No. 00 is used for the anastomosis. The rent is about 2 cm. long. The incision in the duodenum is made in the vertical direction. The second row of sutures is made with linen or chromic catgut No. 00. Sometimes omentum is attached to the suture line. Two drains are inserted, one into the subhepatic region and the other at the site of the anastomosis. The drains are left in place from 24 to 48 hours. JOSEPH K. NARAT, M.D.

Spatolisano, B.: Atypical Initial Reticuloendothelioma of the Jejunum Associated with Chronic Stenosing Jejunitis (Reticoloendotelioma atipico iniziale del digiuno associato a digiunite cronica stenosante). *Gior. ital. chir.*, 1945, 1: 35.

The author describes the combination of a chronic, nonspecific inflammatory process with a tumor formation of reticuloendotheliomatous character in a 45 year old woman who was admitted with complaints of pain in the epigastrium of 1 year's duration. She vomited on rare occasions. Diarrhea alternated with constipation. A considerable degree of malnutrition was present. Roentgenographic studies disclosed duodenojejunal stenosis.

An operation was performed under a combined basal and local anesthesia. A deformity of jejunum 7 cm. long was found 3 cm. from Treitz' ligament. In the involved region the intestinal wall was thickened and indurated and the corresponding mesentery was infiltrated and contained numerous small lymph nodes. There was a sharp line of demarcation between the affected portion and the adjoining healthy tissue. The lesion was resected and an end-to-end anastomosis was performed. The patient recovered.

Reticuloendothelioma is characterized by: (1) a mesenchymal aspect and the capacity of producing reticular fibrillae; (2) phagocytic activity; (3) syncytial structure, and (4) the tendency to develop chiefly in endothelial direction. The following varieties may be distinguished: (1) tumors with a mesenchymal aspect, (2) tumors with a reticular aspect, (3) tumors with a pulposplenic aspect, (4) giant cell tumors, and (5) tumors with an endothelial aspect.

The inflammatory process in the author's case resembled regional ileitis. The author believes that

the central nervous system. No effect whatever occurs if the vagus section has been complete.

Of the 39 patients subjected to the operation at the time of this report, 1 died. This patient developed postoperative bronchopneumonia. Thirty of the patients in this series had duodenal ulcers, 2 had gastric ulcers, and 7 had gastrojejunal ulcers. Eight of those with duodenal ulcer were subjected to gastroenterostomy in addition to the vagus section because of high grade pyloric stenosis. In most of the cases of this type the vagus section was done by the abdominal approach at the same time as the gastroenterostomy. Only 1 of the patients with duodenal ulcer failed to obtain striking and persistent relief from his symptoms, and in this case there were many features suggesting a neurosis. The first group of patients have been followed up for 2½ years and, so far, have remained well on unrestricted diets and without medication. For the remainder of the patients a longer period of observation is required before conclusions can be drawn, especially in the cases of gastrojejunal ulcer.

The operation has no effect on the secretory response of the stomach to histamine or caffeine but abolishes the stimulating effect of insulin hypoglycemia and a sham meal. Vagotomy reduced gastric secretion in the empty stomach at night from 50 to 60 per cent. It also resulted in the reduction of hypertonicity, but the tonus and motility of the stomach were not abolished. An interesting observation was the fact that patients who complained of constipation before the operation were relieved of this disturbance. Further study of this effect is necessary. HAROLD LAUFMAN, M.D.

Riera, M., and Diaz, F.: Low or Infrabulbar Duodenal Stenosis (Estenosis duodenales bajas o infrabulbares). *Rev. med. Chile.* 1945, 73: 855.

In the majority of cases of duodenal stenosis the narrowing is located in the bulb and caused by a peptic ulcer. Roentgenograms show a pyloric stenosis with a secondary dilatation of the stomach. Stenosis in the lower segments of the duodenum is rare and may be due to various factors. As a rule, roentgenological studies allow a correct diagnosis and often throw light on the nature of the lesion.

An infrabulbar duodenal stenosis may be congenital or acquired and of intrinsic or extrinsic origin. A congenital stenosis is usually caused by a malformation. Complete duodenal atresia is incompatible with life. A ring of atrophic pancreatic tissue may cause a compression of the duodenum. In such cases a concentric stenosis of the second portion of the duodenum with smooth borders is seen in the roentgenograms. A diverticulum may produce a duodenal stenosis, especially when it is filled with food. In this respect the condition may be compared with stenosis of the esophagus caused by a distended Zenker's diverticulum.

A spastic condition must be taken into consideration in an acquired duodenal stenosis. Such spasms may be caused by a stone impacted in the common duct. Roentgenograms are essential for the diagnosis in such cases. Tumors of the duodenal wall or an extrabulbar peptic ulcer may produce a stenosis of the duodenum. A cancer of the duodenum responsible for a stenosis has been reported. In the majority of cases an infrabulbar stenosis is due to an extrinsic lesion. The second portion of the duodenum may be compressed by the middle colic artery if ptosis of the right portion of the colon changes the normal position of the blood vessel. The root of the mesentery may compress the duodenum in patients with an intestinal ptosis or a short mesentery. In such cases the duodenum is compressed between the spinal column and the mesentery. There is also an acute type of arteriomesenteric stenosis, the mechanism of which is still under discussion.

An extrinsic infrabulbar stenosis may be caused by a tumor in one of the adjoining organs, either by compression or infiltration of the duodenal wall. Tumors of the gall bladder, pancreas, liver, or the left kidney may cause a compression of the duodenum. Acute hemorrhagic pancreatitis may be followed by an enormous increase in the volume of the organ, with compression of the duodenum.

Mesenteric lymph glands, enlarged on account of Hodgkin's disease, leucemia, or lymphosarcoma may produce infrabulbar compression of the duodenum. An aneurysm of the aorta may also be responsible for such a compression. Periduodenal adhesions, periocholecystitis, plastic postoperative peritonitis, or congenital bands may cause a compression of the infrabulbar portion of the duodenum.

Roentgenographic studies reveal a dilatation of the duodenum above the stenosis and an abnormally long retention of the ingested barium. A vigorous palpation of the involved region may provoke antiperistaltic waves and in the presence of pyloric insufficiency a reflux into the stomach may be observed. An obliteration of the mucosal folds is typical for the distention above the stenosis. If the stenosis is nqt complete, irregular contours of the duodenum may be noticed in the roentgenograms. Introduction of an opaque substance through a duodenal sound may prove useful. Pendulous movements of the normal duodenum may be confusing and therefore repeated examinations are desirable. A supernumerary duodenal loop in the second portion of the duodenum may also create confusing images.

The authors report 11 cases of infrabulbar duodenal stenosis, 5 in men and 6 in women. In 9 it was possible to establish a definite etiology while in 2 the cause remained doubtful. The ages of the male patients ranged from 22 to 42 years and of the female, from 40 to 78 years. JOSEPH K. NARAT, M.D.

Houot, A., Five Cases of Cholecystoduodenostomy (A propos de Cinq cas de cholécystoduodénostomie). *Union med. Canada*, 1946, 75: 24.

As a rule, cholecystogastrostomy is preferred to cholecystoduodenostomy although it is a less physiological method. If technical difficulties are encoun-

tered, occasionally a cholecystojejunostomy is performed, although it is the least satisfactory method.

In the course of 10 years the author performed 5 cholecystoduodenostomies and only 2 cholecystogastrostomies. Usually these operations are done on account of bile fistulas with great loss of bile, or on account of retention icterus. The last mentioned indication was present in 4 patients in the author's material. All of them had a cancer with numerous metastases in close vicinity to the primary tumor and at distant places. In 2 patients jaundice was due to carcinoma of Vater's papilla, in 1 patient it was due to a cancer of the pancreas, and in a fourth it was due to a malignant tumor of the common duct.

In 4 cases the anastomosis was employed as a palliative measure, to limit bile drainage, to suppress jaundice, and to create in the patients the impression that they were cured. The patients survived the operation 14 months, 3 months, and 1½ months, respectively, while the fourth patient succumbed to a bronchopneumonia on the eighth postoperative day.

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The author describes the combination of a chronic, nonspecific inflammatory process with a tumor formation of reticuloendotheliomatous character in a 45 year old woman who was admitted with complaints of pain in the epigastrium of 1 year's duration. She vomited on rare occasions. Diarrhea alternated with constipation. A considerable degree of malnutrition was present. Roentgenographic studies disclosed duodenojejunal stenosis.

An operation was performed under a combined basal and local anesthesia. A deformity of jejunum 7 cm. long was found 3 cm. from Treitz' ligament. In the involved region the intestinal wall was thickened and indurated and the corresponding mesentery was infiltrated and contained numerous small lymph nodes. There was a sharp line of demarcation between the affected portion and the adjoining healthy tissue. The lesion was resected and an end-to-end anastomosis was performed. The patient recovered.

Reticuloendothelioma is characterized by: (1) a mesenchymal aspect and the capacity of producing reticular fibrillae; (2) phagocytic activity; (3) syncytial structure, and (4) the tendency to develop chiefly in endothelial direction. The following varieties may be distinguished: (1) tumors with a mesenchymal aspect, (2) tumors with a reticular aspect, (3) tumors with a pulposplenic aspect, (4) giant cell tumors, and (5) tumors with an endothelial aspect.

The inflammatory process in the author's case resembled regional ileitis. The author believes that

the tumor developed following the inflammatory process. JOSEPH K. NARAT, M.D.

Tan, C. C., and Liu, Y.: Amebic Colitis with Special Reference to Perforation. A Study of 20 Autopsied Cases. *Chin. M. J.*, 1945, 6● 366.

During a period of 19 years the clinical diagnosis of amebic colitis was made in 349 patients in the hospital of the Peiping Union Medical College. In 9 of 20 cases in which autopsy was performed, perforations were found. Eleven of 20 patients gave no history of dysentery; of those with perforation all except 1 were admitted with symptoms and signs of acute amebic dysentery which had been present from 1 week to 4 months. Of the entire series of cases more than half showed varying degrees of diffuse ulceration, usually in the sigmoid colon and the cecum. The cecum presented the most severe lesions and the largest number of perforations. The ileum was involved in 7 of 20, and the appendix in 5 of 15 cases examined. The cecum was perforated in 5 instances, the descending colon in 4, the sigmoid in 2, and the transverse colon in 1 instance. In 2 instances multiple perforations were found.

The authors point out that whereas the diagnosis of amebic colitis is usually simple, that of perforation may be easily missed, particularly if there is no history or previous diagnosis of amebic colitis. Abdominal distention, tenderness, and muscle spasm are the common early findings. Emetine is not effective in controlling perforation after the anatomical lesions reach an advanced stage. Once perforation of the intestine occurs, the chance of recovery is slight. One case in which the patient survived perforation of the cecum and the formation of a fecal fistula is reported.

WALTER H. NADLER, M.D.

Pfeiffer, D. B., and Patterson, F. M. S.: Congenital or Hereditary Polyposis of the Colon. *Ann. Surg.*, 1945, 122: 606.

In every individual who is found to have rectal polyps, a complete study of the intestinal tract is necessary. This includes proctoscopic examinations, barium enema studies (postevacuation films and double contrast studies), and, finally, roentgenograms of the stomach and small intestine.

The family history of every individual with multiple polyposis of the colon should be thoroughly investigated, since this condition is often on an hereditary basis. Early diagnosis and treatment is very important, for intestinal polyps tend to become malignant.

A satisfactory plan of treatment includes fulguration of the polyps in the anus, rectum, and sigmoid, followed later by ileorectosigmoidostomy and, finally, by colectomy. The outlook for these patients is good if treatment is begun early.

Five cases of multiple polyposis of the colon are reported, 4 of which had a definitely hereditary aspect. The classification, etiology, pathology, symptoms, diagnosis, and treatment of congenital multiple polyposis are discussed, and special emphasis is placed on the tendency of the polyps to undergo malignant changes.

JOHN E. KIRKPATRICK, M.D.

Weinberger, H. A.: Observations on Large Bowel Perforations. *Surgery*, 1945, 18: 547.

In the Lenox Hill Hospital, New York, 19 cases of large bowel perforation were recorded among 1,400 autopsies during the last 10 years. Ten of the 19 cases were attributable to a perforation complicating diverticulitis, 7 were due to malignancy, and 2 were due to perforation by mechanical agents within the lumen. Four recent cases in which autopsies revealed perforations of the large bowel are reported in detail.

Attention is called to the high morbidity and high mortality in diverticulitis complicated by perforation. The prognosis is also grave in large bowel malignancies that are complicated by perforation, which may cause the first serious symptoms in from 10 to 20 per cent of these cases.

Two unusual cases of perforation of the sigmoid due to an intraluminal insult are recorded; one was due to impaction of a fowl bone and the other was caused by rupture after a vigorously administered enema.

Treatment of perforation from any cause is essentially the same. The surgical measures stressed are early and generous drainage with a minimum of manipulation of the site of penetration and a proximal decompressive colostomy.

WALTER H. NADLER, M.D.

Meyer, K. A., and Kozoll, D. D.: Preparation for Surgery of Patients with Colon Lesions. *Q. Bull. Northwest. Univ. M. School*, 1945, 19: 249.

By virtue of a carefully planned preoperative, operative, and postoperative regimen, it has been possible to resect the colon if unobstructed, perform a primary "open" anastomosis, return the colon to the peritoneum without performing a proximal colostomy, and close the wound without drainage, with only one death among the first 26 patients with lesions of the left half of the colon who were treated in this manner. This was possible only because of the many physiological aids with which the authors were able to surround their surgical patients. The advantages of this procedure over previous ones in which a colostomy (either proximal to or at the site of resection) was required are: (1) a more radical resection is possible because no bowel has to be spared for use as a proximal or distal loop of the colostomy; (2) such complications of exteriorization operations as wound infection, herniation, prolapse, fecal fistula, obstruction, and stricture formation are obviated; (3) a temporary colostomy and the morbidity associated with its closure is avoided; and (4) primary resection and anastomosis without proximal colostomy is a one stage operation with a shortened period of hospitalization and no return visits for subsequent operations.

The authors describe their preoperative management with special reference to diet, parenteral amino acids, plasma infusions, blood transfusions, succinylsulfathiazole, vitamins, enemas, Levine tube suction, complicating diseases, and preanesthetic medication.

The importance of an adequate diet in patients with malignant lesions of the colon is best illustrated by the incidence of hypoproteinemia in this disease; the authors have reported an incidence of 30 per cent, compared to the average incidence of 23 per cent in a large group of surgical lesions.

The value of amino acid digests for parenteral protein nutrition in human beings, both to supplement that which can be given by mouth and to supplant oral feedings, when the latter is unfeasible, has been demonstrated. The availability of amino acids for intravenous use is an important adjuvant to surgery and can often be lifesaving.

The use of plasma as a source of protein nutrition has long been recommended, but subsequent experiences have indicated that it, too, has short-comings.

If one remembers the constituents of blood, one should not be surprised that whole citrated blood transfusions have proved the most important aid in the preparation of patients for operation. The authors believe there is a striking effect produced by whole blood with amino acids and they combine these two fluids in clinical practice on the theory that amino acids will be utilized for tissue protein metabolism whereas the whole blood will be more effective upon the circulating proteins.

Succinylsulfathiazole has been the single greatest boon to colon surgery and has given considerable confidence in the undertaking of primary colon resections by an "open" technique rather than to rely upon crushing clamps with which so-called aseptic anastomoses are carried out. With the advent of this plan of chemotherapy, not a single instance of postoperative peritonitis has been seen in the authors' series of cases and only 1 patient developed a wound infection which required drainage.

The indications for vitamin therapy in the preparation of surgical patients are manifold. Most of these patients have a deficiency of one or more vitamins.

The first enema and cathartic are given prior to the start of succinylsulfathiazole therapy. The second enema is given during the 24 hour period preceding surgery; this is done to allow the drug to attain as high a concentration as possible.

Intragastric suction should be established before operation to prevent distention. Control of distention prevents tension on the suture line and is as effective as a proximal colostomy with regard to decompression. Also, the intragastric tube will aspirate swallowed inhalant anesthetic gases if used, and help prevent postoperative aspiration pneumonia. Still another value in the use of this tube lies in the fact that the patient can drink freely immediately after operation, which minimizes the dangers of a postoperative parotitis.

Because most patients with colonic diseases are in the sixth and seventh decades, a proportionately higher incidence of diabetes, hypertrophied prostatic disease, hypertension, and oral sepsis is present. Unless the patient is acutely obstructed, all of these conditions demand correction before bowel resection is undertaken.

The authors describe their operative management with special reference to anesthesia, open versus closed resections, sutures, wound repair, blood transfusions, Levine tube suction, and vasoconstrictive drugs.

Whenever possible they have employed nupercaine spinal anesthesia, which provided an adequate period of anesthesia without the use of inlying intraspinal needles.

Any attempt at following a so-called aseptic technique in anastomosis has been avoided deliberately, for it is believed that the use of clamps in closed resection is not without the danger of necrosis of the bowel edges, and is cumbersome.

The authors employed the principle of fine interrupted sutures on atraumatic needles in the anastomosis and the wound as well.

Interrupted sutures are used in closing all layers of the wound.

Blood transfusions are given during the operation, although the patient may have received 2,000 c.c. or more of blood during the preoperative period. This is the most effective means of preventing shock and compensating the patient for blood loss sustained as the result of surgery.

Suction with the Levine tube is continued during the operative period to decompress the stomach which might otherwise obscure the operative field, to prevent the swallowing of inhalant gases if given, and to prevent the aspiration of gastric content through emesis.

Vasoconstrictive drugs are given to prevent the drop in blood pressure frequently seen with spinal anesthesia; the authors' particular preference is neosynephrin.

Granted that the patient is operated upon most skillfully after having been prepared as carefully as outlined, a successful result will not be achieved unless he is given equally painstaking postoperative care. This care includes a wide variety of therapeutic adjuncts, many of which have been outlined in the preoperative regimen.

Attention must be paid to the physiological principles of fluid balance.

Blood transfusions were rarely necessary postoperatively in patients who have been given 2,000 c.c. or more of blood before and during operation. However, unlimited quantities of whole blood are administered to patients showing the need for it.

The rationale for the authors' use of parenteral amino acids has been discussed, but the need for them is frequently more acute because of starvation which may follow colon surgery.

The rationale for gastric suction has been outlined. Suction should commence before the patient is sent

to the operating room, continued during the operation, and resumed immediately after his return to bed.

Hyperventilation is employed routinely, with mixtures of carbon dioxide and oxygen, and is administered every 1 or 2 hours until the patient breathes deeply or coughs. By this means greater oxygenation of the pulmonary alveoli occurs, mucus is dislodged, and pulmonary complications are avoided. Oxygen is used routinely either with a nasal catheter or nasal mask in patients whose condition is precarious or who have a cardiac complication.

Vitamins are administered with the intravenous fluids in the dosages given during the preoperative period; they are given orally when the patient resumes a diet, but are usually not necessary when he is ready to leave the hospital.

While the patient is on gastric suction, all sulfonamides are administered intravenously in dosages adequate to maintain a level of from 8 to 12 mgm. per cent in the blood. Sodium sulfadiazine is the drug of choice and usually not more than 5 gm. per day is required.

The drinking of water is encouraged as soon as the patient returns to bed.

Elevation of the foot of the bed is employed for the first 24 hours to prevent shock and encourage the drainage of mucus from the respiratory tract.

Catheterization is required more frequently after spinal anesthesia and is done if the patient has not voided by the end of the first day.

Patients are placed in a wheel chair for 15 minutes on the first postoperative day, and more frequently and for longer intervals thereafter. They walk without aid by the sixth or seventh day.

The diet is not resumed until the Levine suction tube has been withdrawn.

Enemas are not administered until the fifth or sixth postoperative day and then only in small amounts.

CHARLES BARON, M.D.

Mason, J. M., III: Surgery of the Colon in the Forward Battle Area. *Surgery*, 1945, 18: 534.

About one-half of the diameter of the entire right colon, both flexures, and a portion of the rectosigmoid is found to lie behind the peritoneum. In explorations and for the relief of tension on colostomies, the simple procedure of mobilizing these areas should be kept in mind. The lateral attachments of these portions of the colon are avascular, the mesentery coming in from the medial aspect, and they can be incised with impunity, the colon being displaced medially.

Injuries of the right colon from the ileocecal junction distally which necessitate the removal of the cecum and any portion of the right colon are a problem because of the difficulty in dealing with the transected end of the terminal ileum. The open end of the ileum is, of course, a problem because of the erosive action of its contents, if they are allowed to drain out into the abdominal wall. There are four ways of handling this problem:

1. A primary anastomosis may be performed between the terminal ileum and the cut end of the transverse colon (end to side ileotransverse colostomy), the blind end of the colon being turned in by suture.

2. An end to side primary anastomosis may be performed, the blind open end of the colon being brought out of the abdomen through a stab wound as a safety valve.

3. A lateral anastomosis may be performed between the ileum and the colon, both ends (ileum and colon) being brought out distal to the anastomosis as a double barreled spur colostomy.

4. The ileum and colon may be exteriorized as a long, sutured, double barreled ileocolostomy constructed for the purpose of early crushing of the spur with a clamp.

The first three procedures are objectionable since they necessitate a primary anastomosis in an unprepared colon. This is too dangerous. The fourth alternative is the one which has been used with good results. Early crushing of the spur at the base hospital within two or three weeks, or earlier crushing at the front, preferably the former, will prevent any irreparable skin erosion. Postoperative care consisting of the administration of vitamins, the correction of dietary deficiencies, and the restoration of the blood chemistry to normal levels will play a large part in such treatment.

All exteriorizations should be made through separate stab wounds and not through the upper or lower poles of an exploratory incision. Often it has been convenient to bring a colostomy out through a débrided wound of entrance or exit, but this is avoided if possible. There is a place for tube cecostomies in the management of single perforations of the cecum. However, in general, it is preferable to exteriorize such wounds. The evacuation of the patient and the change of management that he is subjected to may result in periods of time during which the proper attention cannot be paid to the tube.

A tube may be of advantage in diverting the stream of ileal contents in an ileocolostomy, or it may be used in a colostomy, but its period of usefulness is not very long as leakage soon occurs around the tube.

Questionably viable areas of colon due to a damaged mesentery or to trauma to the wall of the gut proper should be exteriorized.

The management of war wounds of the colon differs materially from the management of lesions of the colon generally encountered in civilian practice. The excellent results obtained in civilian practice by the performance of primary anastomosis on the properly prepared colon permits the immediate replacement of the anastomosed portion in the general peritoneal cavity. In dealing with emergency war surgery it is believed that all colon injuries should be exteriorized and that no primary anastomosis is warranted.

BENJAMIN GOLDMAN, M.D.

Pierpont, R. Z., Peterson, F. R., and Dulin, J. W.: Operative Results of Surgery of the Colon for Neoplastic Disease. *Surgery*, 1945, 18: 541.

The operative results of colon surgery for neoplastic disease covering the period between January 1, 1937 and December 31, 1944 in the State University of Iowa Hospitals, Iowa City, are reviewed and the results of treatment tabulated. Exploration was carried out in 224 patients and of these 117 had resection of the colon, a resectability rate of 52 per cent.

Among the 224 patients operated upon there were 46 deaths, a mortality of 20.5 per cent. Among 117 resections 23 deaths occurred, a mortality rate of 19.6 per cent. Among 81 patients in whom a palliative operation was done for the relief of obstruction there were 17 deaths, a mortality rate of 20.9 per cent. Altogether there were encountered 142 lesions of the left side and 82 lesions of the right side.

The authors report that an increasing number of resections with immediate end to end anastomosis are being performed in their clinic and point out that there is no one operative procedure which can be applied to all neoplasms of the colon.

WALTER H. NADLER, M.D.

Miles, W. E., Gordon-Watson, C., Milligan, E. T. C., and Corbett, R. S.: A Discussion on the Management of the Permanent Colostomy. *Proc. R. Soc. M.*, Lond., 1945, 38: 691.

Miles observed that very few doctors appreciate the value of the daily wash-out of the colon for controlling bowel movements. There is no doubt whatever that bowel action can definitely be controlled by means of a daily wash-out with 1½ pints of plain water at a temperature not exceeding 80°F. as determined by the thermometer. This is repeated if necessary. Should the temperature exceed 80°F., inertia of the muscular coat of the colon is produced, which results in retention of part of the fluid used, and several hours may elapse before the muscular inertia disappears. A plain wash out, if properly administered, can be relied upon to clear the colon completely of its fecal contents. It sometimes happens that difficulty is experienced in introducing the tube into the colon to the required extent. As a rule this is due to the attempt to introduce the tube when the patient is sitting up or standing, or when he raises his head in order to pass the tube under guidance of the eyes and puts his abdominal muscles on the stretch. In order to pass the tube, the patient should be recumbent with the abdominal muscles completely relaxed. One of the causes of difficulty in passing the tube is acute angulation of the colon at the point where it changes direction and passes forward to the opening in the anterior abdominal wall. Such angulation can be entirely prevented by mobilization of the terminal portion of the descending colon.

A weak spot in the abdominal wall has been created by the passage through it of the loop of pelvic colon destined for the formation of the colostomy. In order to afford support to the weakened abdominal wall a well fitting colostomy belt must be obtained. On no account should the patient allow himself to be persuaded to have a rubber bag attached to the cup of the belt to act as a receptacle for feces. Such a bag creates suction and in the course of time the part of the colon which is proximal to the stoma is turned inside out and extruded through the stoma. It is important that the belt should be worn continuously when the patient is up and about.

The stoma of a colostomy should be prevented from becoming stenosed by systematic dilatation. For this purpose the patient must be taught to pass his index finger to its full extent through the stoma. He must also be instructed how to pass his finger to its full extent before flexing the distal joint. As soon as the colostomy wound has healed firmly the index finger of the left hand (if the stoma is on the left side) should be passed through the stoma every day for a month, then once a fortnight for two months and finally once a month for six months, when it will be found that the tendency to contract has ceased.

GORDON-WATSON states that in order to secure a good working colostomy it must be well fashioned, and first of all it is essential to secure a good spur by keeping the bowel outside of the abdominal wall for at least three weeks by the use of a glass rod or other means; it is also necessary to avoid undue tension on the mesentery. The stoma should be well clear of the anterior superior spine to avoid interference with the belt. The size of the opening in the abdominal wall should be just large enough to allow a finger to pass down on either side of the glass rod. An ellipse of skin should be removed to prevent subsequent contraction which is apt to cause recession of the opening. All cups and bags should be avoided; a plain celluloid disc is all that is needed. Some patients find this unnecessary and wear only a singlet.

The colostomy is trained to act only when it is washed out, which is done at the same time each day, with plain tepid water without soap, and a flexible tube (size 14) which is passed up as far as possible with great care. The fluid is run in slowly, preferably by funnel.

When this is carefully carried out at the same time each day, the colon learns to respond in an automatic way and many victims carry on their work with little disability. In a small percentage of cases the colon will behave as if the stoma was the rectum and act regularly and automatically without a wash-out, with or without a mild aperient. If there is a tendency to looseness disasters may occur.

GABRIEL stated that after a colostomy (terminal, loop, left iliac, or transverse) has been established, we have to decide if the bowel is to be allowed to act naturally or whether the wash-out regime is to be adopted. He is opposed to the wash-out regime for colostomies for the following reasons:

1. It is unnecessary, because the great majority of colostomy patients have good intestinal function

and with reasonable care and discretion in diet they achieve a satisfactory and regular rhythm with formed colostomy actions.

2. It is harmful because it is not natural for the colon to have a solution thrust into it daily, be it plain water, normal saline solution, or soap and water. Colonic lavage for prolonged periods induces a chronic catarrh of the colon with a hyperemic mucosa, a contracted bowel lumen, and the excessive formation of mucus; in other words this routine induces a state of catarrh and irritability in the colon which is exactly contrary to what is desirable after a colostomy.

3. It is dangerous because the passage of a tube up the colostomy may lead to perforation, peritonitis, and death. In hospital work a colostomy wash-out is rarely necessary in the immediate postoperative period, and usually the insertion of a glycerine suppository serves the purpose equally well.

MILLIGAN says that there is no surgical substitute for the rectum. The rectum is under the control of the patient for storage and ejection. A colostomy can never be trained to have conscious sensations or voluntary powers similar to the rectum. The crude muscles of the abdominal wall cannot act like the specialized rectal and anal muscles in retention and expulsion.

The same rhythm or regularity of bowel action can be attained with a colostomy as with a normal rectum, that is, the 24 hour rhythm, for in all of us, with or without a rectum, this rhythm depends upon the colon.

This author states, "We cannot control the colostomy but it can be controlled." He also maintains that Nature's standard of one and only one motion a day can be reached with a colostomy. How then are we to attain but one bowel action a day for a colostomy?

The answer is "by routine morning wash-out if the rhythm does not come naturally after a short trial." A bowel completely emptied by a wash-out followed by a morning bath and clean dressings enables a man to face the day and his fellows without handicap.

The bowel action is likely to be regular after the removal of the rectum if the daily evacuation before colostomy was by rhythm rather than by feeling.

CORBETT considers the subject under two headings: (1) the part played by the patient, and (2) the part played by the surgeon.

The patient wants a regular evacuation of the bowel and freedom from the anxiety of leakage. He wishes to be able to carry on his daily life in much the same way as he was accustomed to do before operation. His part in the management can be carried out in one of two ways:

1. Training the bowel to act regularly of its own accord in order to have a daily action.

2. Washing out the bowel regularly every day.

In the part played by the surgeon it is of great importance that certain essentials should be remembered in the formation of the colostomy and in the management of the postoperative period. This will lead to easy management and avoid complications.

1. There is a choice of three positions for the stoma: at the left ilium, at the rectus sheath, and possibly at the epigastrium. Colostomies in all of these positions appear to work equally well.

2. The formation of an adequate spur is essential. A glass rod is popular, easy to apply, and very satisfactory. The rod or a substituted rubber tube should remain in position for 3 or 4 weeks.

JOHN J. MALONEY, M.D.

Butts, J. B., and Conley, J. E.: Perinephric Abscess; Report of 3 Cases Simulating Acute Appendicitis. *U. S. Nav. M. Bull.*, 1945, 45: 1081.

In the differential diagnosis of any abdominal pain, one should consider perinephric abscess, although it is uncommon. The syndrome of obscure fever with pain in the right flank and abdomen due to perinephric abscess may be easily confused with acute appendicitis and lead to a deleterious appendectomy. The authors report 3 cases simulating acute appendicitis.

A perinephric abscess is an infection outside of the kidney capsule, with resultant necrosis of the perirenal connective tissue and suppuration in the renal fossa. The cases presented were simple perinephric abscesses as contrasted to complicated abscesses associated with pathological kidney changes. Authorities differ in opinion as to whether all perinephric abscesses are secondary to some infection in the kidney.

Abdominal exploration may be undertaken when the clinical picture of perinephric abscess simulates acute appendicitis, and when urinary abnormalities are absent as they were in these 3 cases. Often there is a history of a skin infection or a severe upper respiratory infection several days or even weeks before the onset of the first symptoms. In these 3 cases no such history was elicited, although in case 2 a severe back injury occurred prior to the onset of the symptoms.

Anorexia, fatigability, and night sweats are early complaints, followed usually by chills and fever. Pain in the right flank radiating to the costovertebral angle and to either of the upper or lower quadrants may be the earliest specific complaint. The 3 patients in this report all had pain in the right flank radiating to the right lower part of the abdomen. Simeone reported that lesions involving the perinephrium anteriorly cause pain in the right lower abdominal quadrant. Atcheson reported that 16 of 117 patients with perinephric abscess presented with complaints of lower abdominal pain, and 8 of the 16 had associated abdominal rigidity. Urinary symptoms are uncommon in cases of simple perinephric abscess.

On physical examination the patients are acutely ill and may show evidence of weight loss if the disease is prolonged. Most of them have tenderness in the right flank, and spasm and swelling are often present also. Simeone reported 2 of 34 cases with

tenderness present in the right lower quadrant only. Scoliosis with the concavity toward the affected side due to paravertebral muscle spasm is a prominent sign of perinephric abscess. Secondary inflammatory involvement of the psoas muscle may cause the patient to hold the hip flexed. Motion of the hip then causes severe pain.

Positive x-ray signs such as obliteration of the psoas shadow, enlargement of the kidney shadow, concavity of the spine toward the side of the lesion, decreased movement of the kidney and diaphragm on respiration, and displacement or distortion of the kidney or ureters may help to make the diagnosis. Only 45 per cent of the cases show positive x-ray signs, so too much emphasis should not be placed on negative findings.

In simple perinephric abscess the urine is normal unless there is some kidney abnormality. The presence of albumin and white blood cells in the urine indicates gross involvement of the kidney itself. The staphylococcus aureus is most commonly cultured from simple perinephric abscesses, while in complicated perinephric abscesses secondary to renal calculus and infection the escherichia coli is found. Chemotherapy before operation may be responsible for negative cultures in some cases.

Prompt surgical drainage is the treatment of choice and leads to dramatic improvement in the symptoms. If the perinephric abscess is complicated, a primary or secondary nephrectomy may be necessary. Usually the disease is far advanced when the diagnosis is made; 12, 7, and 8 days, respectively, intervened between the admission of the patient and operation in the reported cases.

There was no mortality in the reported cases of simple perinephric abscess, while mortalities of from 14 to 50 per cent were encountered in cases of complicated perinephric abscess.

ROBERT R. BIGELOW, M.D.

LIVER, GALL BLADDER, PANCREAS, AND SPLEEN

Nigam, K. S., and Sircar, J. K.: An Additional Test Helping in the Diagnosis of Chronic Cholecystitis. *Ind. J. Surg.*, 1945, 7: 95.

Patients with chronic cholecystitis show marked cholesterol retention. The authors estimated the cholesterol in separated serum, for which they used the colorimetric method. In most of the cases the estimation was done on an empty stomach in order to eliminate the dietetic factor. The estimation was carried out on 86 cases.

The minimum figure was 73 mgm. in a child aged 10 years, and the maximum was 250 mgm. in an old man of 60 suffering from an enlarged prostate with secondary vesical calculus; therefore, the average was 145.9 mgm. The table shows the amounts of serum cholesterol within certain limits in the cases: In this series of cases the reading is higher than that found in the whole blood in India by other workers, but it approaches the readings in other countries.

Serum Cholesterol	No. of cases	Percentage
Below 100 mgm.....	4	4.7
Between 100 and 119 mgm.....	15	17.4
Between 120 and 139 mgm.....	25	29.1
Between 160 and 179 mgm.....	11	12.8
Between 180 and 100 mgm.....	10	11.6
Between 200 and 220 mgm.....	5	5.8
Above 200 mgm.....	2	2.3

The ingestion of food rich in cholesterol for some time has been known to produce an increase in the blood cholesterol. It has been the aim in the present work to study the changes in the amount of cholesterol in the blood of human beings after a single ingestion of fatty diet and to compare them with the changes so obtained in patients with cholecystitis. At the very outset it may appear that the test of giving fatty diet may not be safe in cases of cholecystitis, but fortunately in this series of cases no complications or trouble occurred. The diet which has been prescribed does not contain such an excess of fat that it upsets the patient, but it has enough cholesterol in it to make the estimation desirable. The test need not be done in cases of acute cholecystitis in which the diagnosis is obvious. It is certainly very helpful in the obscure and chronic cases. In acute cases the test should be applied after the acute symptoms have subsided and the patient is allowed solid diet.

It was found that 11 of 12 cases showed the maximum rise in the cholesterol level was below 80 mgm; only in 1 case the figure was high. The average was about 52 mgm. Seven cases of gall bladder disease could be studied and of these 6 were cases of chronic cholecystitis and 1 was a case of cancer of the gall bladder, as proved on the operating table. In 3 cases the cholesterol metabolism could be studied both before and after operation and it was noticed that the rise in the level was not so high after the operation of removal of the diseased gall bladder. If tables are compared after the diseased organ is removed from the body in cases of cholecystitis the metabolism curve again becomes low like that of other normal people. It can be judged by comparing the graphs of patients who have been operated upon. If the rise of cholesterol is between 100 and 150 mgm. the case is probably one of cholecystitis, but if the rise is more than 150 mgm. one should be inclined to think it is a case of cholecystitis and this adds to the existing methods of confirming the diagnosis of chronic cholecystitis.

By comparing the tables one is forced to think that the marked rise in the level of the serum cholesterol in the table shown herewith is certainly due to the diseased condition of the gall bladder. In all of the first 6 cases the rise was more than 100 mgm., the minimum being 106 mgm., the maximum 188 mgm., and the average 161.5 mgm. The seventh case was that of a cancer of the gall bladder and in this the rise was only 75 mgm., although the fasting serum cholesterol was 300 mgm. and was due to jaundice. It is only in the chronic inflammatory conditions of the gall bladder that a marked rise in the level of

serum cholesterol occurs; in the case of a new growth this was not noticed. CHARLES BARON, M.D.

Ottoman, R. E., and Baker, J.: Metastatic Staphylococcal Infection of the Gall Bladder. *West. J. Surg.*, 1945, 53: 361.

The authors report 2 cases of empyema of the gall bladder as a complication of simple superficial staphylococcus infections. One was secondary to a felon of the thumb, and the other followed a succession of boils. Staphylococci were cultured from the gall bladder in each case. One gall bladder contained stones, but no stones were found in the other.

In each patient the diagnosis was difficult because of red cells, pus cells, and staphylococci in the urine. In 1 patient a severe pyelonephritis intervened between the boils and the cholecystitis, in the other a perirenal infection was suspected but it was not proved.

Cholecystostomy was done in each case and resulted in recovery. EARL O. LATIMER, M.D.

Mirizzi, P. L. : The Cystic Duct in Biliary Lithiasis (El conducto cistico en la litiasis biliar). *Prensa med. argent.*, 1945, 32: 2149.

The author describes the normal anatomy and histology of the cystic duct and variations of the position of the duct under pathological conditions.

Mucostasis of the cystic duct may be caused by an abnormally high resistance of the sphincter of Oddi, increased mucous secretions of the extrahepatic ducts, dilatation, and hypertrophy of the wall of the cystic duct.

The cystic duct may be entirely absent and in such cases the gall bladder empties itself directly into the common duct. The cystic duct may also form a junction with one of the hepatic ducts, usually the right. A double cystic duct has also been described. The cystic duct may be adherent to Hartmann's pouch. Cases of primary carcinoma of the cystic duct have been reported in the literature.

A dilatation of the distal portion of the cystic duct comparable with a river estuary, may be the sequel of stenosing inflammation or functional disorders of the sphincter. Such formation is of practical importance because a ligation of the cystic duct may produce traction on the opposite wall of the common duct and lead to an interruption of the biliary flow.

Under normal circumstances the cystic duct forms an acute angle with the hepatic duct. As a result of a gallstone formation this angle may become more pronounced and interfere with the bile flow to the gall bladder. Paroxysmal crises accompanying the resulting anatomofunctional hepatic syndrome may become quite serious and may produce jaundice. Sclerosis of the biliary ducts in such cases distorts the normal anatomy and there is great danger of inadvertent ligation of the right branch of the hepatic artery.

Clinical diagnosis of primary carcinoma of the cystic duct is impossible. As a rule, the condition is mistaken for cholelithiasis.

Biliary fistula of the cystic duct after an operation is usually due to a stone formation between Heister's valves. Occasionally a biliary phlegmon of the abdominal wall, without a stone formation, may lead to the formation of a fistula of the cystic duct.

Lithiasis of the cystic duct is a rare condition. Icterus is observed in about one-third of all the cases.

An inflammation of the stump of the cystic duct following cholecystectomy, without a stone formation, is relatively frequently responsible for postoperative pains.

Neuromas in the wall of the cystic stump may be responsible for postoperative pains. A dilatation of the stump of the cystic duct may be followed by a concomitant dystonia of the sphincter of Oddi. Sometimes such conditions require a choledochoduodenostomy.

In selected cases abnormalities of the lumen of the common duct may be corrected by the implantation of the cystic duct into the duodenum in order to sidetrack the bile flow. The operation may be considered in some cases of incipient stenosing pancreatitis.

The author advocates preservation of the cystic duct after cholecystectomy not only to facilitate operative cholangiography but also to create a safety valve in cases in which an incomplete obstruction of the distal third of the common duct is present.

JOSEPH K. NARAT, M.D.

Dameshek, W., and Miller, E. B.: The Megakaryocytes in Idiopathic Thrombocytopenic Purpura, a Form of Hypersplenism. *Blood, J. Hemat.*, 1946, 1: 27.

The megakaryocytes of the sternal bone marrow were studied at biopsy in 11 cases of idiopathic thrombocytopenic purpura and compared with those of 10 normal individuals, of 5 cases of thrombocytopenic purpura associated with various types of splenomegaly, and of a large group of miscellaneous hematological conditions associated with a reduction in platelets including leucemia.

Megakaryocyte counts expressed in terms of a million nucleated red cells and differential counts of megakaryocytes were made. The megakaryocytes were classified as megakaryoblasts, promegakaryocytes, and mature forms, and were further subdivided into those showing granularity, platelet production, degenerated forms, and mitoses.

In the normal individuals, not more than 300 megakaryocytes per million nucleated red cells were present, and an average of 68.6 per cent showed platelet production. In the case of acute idiopathic thrombocytopenic purpura, although the platelets in the circulating blood were rare, the megakaryocytes were increased, being present in a proportion of from 366 to 743 per million nucleated red cells. However, platelet production was greatly diminished and found in from only 8 to 19 per cent of all megakaryocytes. Following splenectomy, there was a striking increase in the platelet production, which was now present in from 69 to 85 per cent of all the cells, and the large masses of new platelets in the

marrow were often very striking. In the cases of chronic idiopathic thrombocytopenic purpura, the megakaryocytes were considerably increased over the normal values, but showed great diminution in platelet production; following splenectomy, extreme degrees of platelet production from the megakaryocytes took place. In splenomegaly of nonleucemic origin (cirrhosis, splenic vein thrombosis, Gaucher's disease, Felty's syndrome) the megakaryocytes were somewhat increased, but platelet production was normal. In aplastic anemia, lymphosarcoma, acute leucemia, and other diseases invading or destroying the bone marrow, the megakaryocytes were conspicuously reduced, the few remaining cells being of normal morphology.

The findings of increased megakaryocytes and greatly diminished platelet production in the marrow before splenectomy and the striking increase in platelet production after splenectomy indicate a definite pathogenetic relationship of the spleen to the disease. Idiopathic thrombocytopenic purpura is probably a form of hypersplenism (splenic thrombopenia) in which, through a possible hormonal mechanism, the megakaryocytes of the bone marrow are inhibited from normal platelet production and delivery. The marrow findings in idiopathic thrombocytopenic purpura are sufficiently characteristic to be of diagnostic value in differentiating the disease from leucemia and other conditions associated with a low blood platelet count. HAROLD LAUFMAN, M.D.

MISCELLANEOUS

Etcheverry, M.: Postoperative Eventration through the Anterolateral Abdominal Wall (La eventracion post-operatoria en la pared antero lateral del abdomen). *Rev. méd. quir. pat. fem.*, B. Air., 1945, 13: 395.

The frequency of eventration remains approximately the same from year to year; it occurred in about 2.5 per cent of all laparotomies according to the author's statistics. Three main factors responsible for eventration must be considered: (1) organic deficiency of the patient, either local or general, (2) technical errors, and (3) postoperative complications which interfere with normal restitution of the tissues.

Four conditions of the abdominal wall can be distinguished in the discussion of disruption of the abdominal wound: the hypertonic and hypotonic abdomen, and the strong and weak abdominal wall.

Eventration occurs mostly in the anterolateral portion of the abdomen, at the site of the fusion of the superficial and deep aponeurosis.

As far as the operative technique is concerned, 3 points are essential: (1) adequate exposure, permitting easy access and manipulation of the organs to be operated on, (2) proper selection of the zone of the abdominal wall, allowing perfect reconstruction, and (3) selection of the direction of the incision with regard for the integrity of the muscular fibers and nerves.

A transverse incision seems to be logical because it is parallel to the blood vessels and nerves. Particular care must be exercised when catgut is used as suture material.

The author mentions three frequent causes of disruption of the abdominal wall: (1) a subcutaneous or subaponeurotic hematoma attributable to insufficient hemostasis, (2) infection of the wound, and (3) the introduction of a drain into the abdominal cavity. The irritating effect of a foreign body such as a drain is intensified by contamination of the abdominal wound by infected fluids escaping from the peritoneal cavity.

The author prefers a double knot to a triple knot because of the facility of tying and a lesser amount of foreign body left in the wound. If a triple knot is used, catgut is usually tied twice in the same direction and the last time in the opposite direction. The author prefers tying the knot in alternating directions. He also maintains that a continued suture approximates the tissue better than interrupted sutures. JOSEPH K. NARAT, M.D.

Colp, R., and Druckerman, L.: Subtotal and Palliative Gastrectomy for Chronic Gastric Ulcer. *Surgery*, 1945, 18: 573.

A series of 42 consecutive patients suffering with chronic gastric ulcer, treated surgically, is presented. The duration of the disease varied from several months to 40 years. The patients were admitted to the surgical service only when the pain was becoming more severe despite adequate treatment, when an intractable pyloric stenosis was evident, when hemorrhages had become recurrent, and when the presence of a carcinoma was suspected. In the series of 42 cases of benign ulcer, the roentgenologist reported 3 cases as being highly suggestive of neoplasm. Of 22 cases in which the gastroscopist could visualize gastric ulcerations, 5 were pronounced malignant but were subsequently proved to be benign. An absolute achlorhydria was present in 12.

The preoperative preparation of such patients, many of whom are in poor general condition, is outlined. At present the authors prefer continuous spinal anesthesia combined with sodium pentothal intravenously since it provides the best relaxation and exposure with a minimal amount of retraction. Exploration is carried out through a median epigastric incision, and the operation of choice is subtotal gastrectomy of the Hofmeister type. If the lesion is so massive that resection appears impossible, preliminary jejunostomy seems a logical procedure to put the stomach at partial physiological rest and cause regression in size of the ulcer so that partial gastrectomy may be performed several weeks later with comparative ease and safety. The stomach is usually removed in a retrograde manner, and antecolic anastomosis, using a short proximal loop of jejunum about 6 inches long, is performed.

In 9 cases in which either a very high gastric resection had been performed, or in which a marked

preoperative dilatation of the stomach increased the possibility of postoperative gastric atony, a complementary jejunostomy for alimentation was done. There were 6 cases in which the antrum and pylorus were removed, but the ulcer was left *in situ*. The so-called palliative gastrectomy has not had wide application and has one major disadvantage—the lesion which is not removed may possibly be carcinomatous. On the other hand removal of the antrum and pylorus of patients suffering from gastric ulcer almost always results in anacidity so that recurrent gastric or gastrojejunal ulcer is almost unknown.

The indications for palliative gastrectomy in this series were penetrating ulcer high on the lesser curvature or ulcers juxtaesophageal in location. The general physical condition in 4 patients was so poor that an excessively high resection necessary to remove the ulcer would have been extremely hazardous.

The postoperative course and complications are described. In the series of 42 consecutive gastrectomies for gastric ulcer there were 2 deaths.

JOHN L. LINDQUIST, M.D.

Poth, E. J., Ross, C. A., and Fernandez, E. B.: An Experimental Evaluation of Sulfasuxidine and Sulfathalidine in Surgery of the Colon. *Surgery*, 1945, 18: 529.

The study made by these authors shows sulfasuxidine and sulfathalidine to be valuable adjuvants in surgery on the colon of the dog. The indications are that the so-called aseptic methods of anastomosis should be used whenever possible, but it is evident that an open technique may be undertaken with a considerably increased degree of safety. These observations support the satisfactory results obtained when man is treated in a similar manner.

The reaction, as revealed by the amount of edema of the omentum adherent to the line of suture, is significantly less when the bacterial flora is modified by the administration of the drugs. The most clearcut evidence of the value of these drugs is revealed by the results which followed the method of open anastomosis, wherein no effort was made to prevent fecal soiling of the operative field. Even though the degree of spillage was much greater following the administration of sulfasuxidine because of the semifluid nature of the contents of the bowel, there was a striking difference in the operative mortality and morbidity. Forty-three per cent of the control animals died of generalized peritonitis due to disruption of the line of suture. One hundred per cent of the control animals showed gross leakage at the line of suture. These observations are in contradistinction to absence of death and lack of gross leakage through the suture line when the animals had received sulfasuxidine and sulfathalidine. Furthermore, in the control experiments there was acute inflammation and little evidence of healing and repair by the fifth postoperative day. Following drug therapy, the inflammation had subsided and the tissues had undergone orderly repair and healing.

BENJAMIN GOLDMAN, M.D.

Patton, E. F.: Proctological Problems of the Pediatrician. *J. Pediat.*, S. Louis, 1945, 27: 532.

The etiology of constipation, painful defecation, frequent small stools, and bleeding per rectum in infancy and childhood is often an abnormality or a disease of the anus or rectum which can be determined by proctologic examination.

A frequent cause of constipation in early infancy is an incomplete dissolution of the membranes between the hindgut and the proctodeum This may be manifest at birth, but may not develop to a degree of marked obstruction for days or even weeks. The opening may be adequate at first, but as time goes on, folds of mucosa of the segment of rectum above the constriction overlap across the lumen, thus forming a valve. A stenosis, in the form of a diaphragm or ring of tissue, can be overcome by one or more gentle dilatations with a lubricated, rubber covered finger.

The usual cause of painful defecation is an anal fissure or an area of proctitis. In an infant or small child an electric otoscope, using a large speculum serves as a useful proctoscope. Anal fissures are readily visible. Proctitis is seen as a red, congested area of mucosa contrasting with the pale pink, normal tissue around it. A regimen to produce small soft stools is necessary to heal a fissure or proctitis. This involves the establishment of two regular toilet times daily, the occasional use of a suppository or enema, the intake of generous quantities of water, stewed fruits and vegetables, the temporary use of combinations of agar and mineral oil by mouth, and anesthetic ointments locally. The healing of fissures and proctitis is aided by the topical application of silver nitrate.

Frequent small but otherwise normal stools may be caused by anal fissure, proctitis, or a local dermatitis. The latter may be due to a fungus infection, pinworms, scabies, cryptitis, or papillitis. The treatment of this complaint is dependent upon the cause.

The many causes of bleeding per rectum are well known. The causes of rectal bleeding visible through the proctoscope are fissure, proctitis, polyp, or ulcer (nonspecific or amebic).

Prolapse of the rectum may be caused by a polyp, but it is usually due to a redundant mucous membrane. In the immediate treatment concern should not be so much for prompt reduction as for permanent retention after reduction. If prolapse is allowed to persist for hours, or even until spontaneous reduction with simple recumbency takes place, the resulting edema and local submucous reaction is helpful in producing thickening and fibrous tissue which will help in permanent retention if the stools can be kept small and smooth enough to pass easily while mucosal edema is subsiding. Various methods are proposed for maintaining reduction, such as continued recumbency, elevated hips, or

strapping the buttocks together with adhesive tape. The anti-constipation regimen as outlined before must be instituted concurrently. If conservative treatment fails to prevent recurrences a sclerosing solution may be injected in the submucous tissues.

Although megacolon is not primarily a proctologic problem, some cases can be relieved by systematic rectal dilatation with graduated dilators.

Perirectal abscess, fistula in ano, and hemorrhoids in childhood are managed as in later life.

ERNEST E. ARNHEIM, M.D.

Alecha, J. M., Carpanelli, J. B., and Ferreira, J. A.: Amebic Abscess of the Liver Opening into the Peritoneal Cavity (Absceso amebiano hepatico abierto en cavidad peritoneal). *Rev. As. méd. argent.*, 1945, 59: 1043.

Amebic abscess of the liver is the most frequent localization of amebiasis outside of the intestine. An analysis of 14,907 cases of amebiasis showed hepatic abscess clinically in 4.86 per cent, but autopsy showed it in 36.6 per cent.

The diagnosis is often not made until perforation occurs, although a careful study of the history should give indications of the true diagnosis. X-ray examination may show malformation of the liver, especially of its diaphragmatic surface, and may also show peritoneal effusion. Rectosigmoidoscopy may be useful in showing dysenteric ulcers. In 90 per cent of the cases the pus in the abscess is aseptic. Amebae are much more apt to be found in tissue curetted from the walls of the abscess.

A case is described in a man of 37 years in whom the diagnosis was not made until operation, although he had a rather typical history. He had been treated in a clinic 3 years before, however, and neither laboratory nor roentgen examination had given any indication of the true diagnosis. When he was admitted with the picture of acute peritonitis a diagnosis of perforated acute cholecystitis was made. Operation showed the true condition and the abscess was evacuated and emetin treatment begun. The amebae disappeared from the feces after the first series of emetin and the patient made an uneventful recovery.

Although the pus of the abscess was aseptic the diagnosis of its amebic character was made from the lack of any history or evidence of pyogenic infection, the macroscopic appearance of the abscess and its contents, the relative seriousness of the case and the slight postoperative peritoneal reaction, the presence of the vegetative forms of amebae in the feces after operation, and the course of the disease.

Some surgeons use emetin intraperitoneally during operation, but the authors do not believe there is any logical indication for its use in this way.

AUDREY G. MORGAN, M.D.

Brunschwig, A.: Radical Resections of Advanced Intra-Abdominal Cancer. *Ann. Surg.*, 1945, 122: 923.

Progress in supportive treatment of the surgical patient permits of the extension of radical surgical attack upon advanced abdominal cancer. Experiences in a series of 100 patients revealed that effective, albeit in some instances brief, palliation was afforded in 35 per cent, and an appreciable and prolonged palliation was achieved in an additional 15 per cent of the series. Given adequate conditions, a more radical attitude in the surgical treatment of advanced abdominal cancer would appear justifiable.

CHARLES BARON, M.D.

GYNECOLOGY

UTERUS

Clift, A. F.: Observations on Certain Rheological Properties of Human Cervical Secretion. *Proc. R. Soc. M.*, Lond., 1945, 39: 1.

Cervical mucus, like most other secretions of the body, is not a true fluid because it does not flow at a steady rate under constant pressure. Furthermore, when pressure is increased the rate of flow does not increase proportionately. Such secretions are complex systems characterized by properties such as anomalous viscosity, elasticity, flow-elasticity, "Spinnbarkeit," and adhesiveness. A study of such physical properties is called rheology.

Experimental evidence and numerous clinical observations suggest that the rheological properties of human cervical mucus undergo a cyclic variation in the menstrual cycle and, furthermore, bear direct relation to ovulation, to penetrability of cervical mucus by spermatozoa, and to pregnancy.

This author has directed his attention primarily to the study of two hitherto unrecognized rheological properties of cervical mucus, namely, flow-elasticity and Spinnbarkeit. When a material showing flow-elasticity is caused to flow along a tube and the pressure is suddenly released, the material recoils towards its original position. This property is accurately measured in the menstroscope, an instrument which consists essentially of a graduated glass capillary tube. One end of the tube is open, the other fits tightly on to a syringe. A small side tube for the control and sudden release of pressure is interposed between the syringe and the main tube.

Spinnbarkeit is the capacity of liquids to be drawn into threads. The most suitable English term now available is "fibrosity." It is a property of cervical mucus and is capable of accurate measurement. The test is carried out by drawing away a coverslip placed on a blob of mucus and measuring in centimeters the thread thus produced.

The author stresses the following points as a prerequisite of interpretation of results:

1. The cervix must be healthy, with no pathological tear, marked erosion, or endocervicitis.
2. Contamination with blood should be reduced to a minimum.
3. The specimen must be collected from the cervical canal, not from the vaginal vault or from the external cervical os.
4. Neither douching nor coitus must have taken place during the 48 hours preceding collection.
5. No antiseptics should be used in collecting the sample.
6. The test for flow-elasticity (elastic recoil) should be performed within 20 minutes of collection of the sample.

The cervical mucus of 26 women showing normal menstrual cycles was studied. Seven of these women were seen more than once, 3 were studied for at least one complete cycle, and 2 became pregnant during observation. Flow-elasticity and Spinnbarkeit were measured. The amount of mucus secreted, the macroscopic appearance, and the number of leucocytes contained in the specimen were also noted. These properties were carefully correlated with the time of the menstrual cycle or pregnancy, and they supply two new rheological tests.

A rheological test for ovulation in woman is described. The sample of cervical mucus is "runny" and homogeneously translucent. Flow-elasticity and Spinnbarkeit are maximum. The cellular content is minimal. At this time penetrability and longevity of spermatozoa are greatest.

A rheological test for pregnancy in woman is described. The sample of cervical mucus is thick and homogeneously opaque. The mucus is difficult to draw into the menstroscope and there is almost complete absence of flow-elasticity and Spinnbarkeit.

These rheological phenomena and tests should prove of value in the recognition of ovulation and anovulatory cycles, in the investigation and treatment of some forms of sterility (cervical hostility), in various types of ovarian dysfunction, and in application as accessory tests for pregnancy.

L. James Talbot, M.D.

Curtis, A. H.: Hypertrophy of the Uterus. *Am. J. Obst.*, 1945, 50: 748.

The usual symptoms of hypertrophy of the uterus are prolonged or excessive menstruation, pelvic pressure with more or less aching discomfort, and increased vaginal discharge.

Examination reveals an enlarged uterus, which is usually heavy, often retrodisplaced, and difficult to differentiate on bimanual examination from adenomyosis of the uterus or diffuse enlargement from deeply buried myomas. Differentiation from carcinoma of the body of the uterus is sometimes difficult, occasionally even after examination of uterine curettings in the cases of hypertrophy with marked endometrial hyperplasia.

Histological diagnosis of the various types of uterine hypertrophy is facilitated by differential stains. With routine hematoxylin and eosin stain, enlarged and thickened blood vessels and the amount of perivascular connective tissue are readily recognized, but accurate determination of the relative proportion of connective tissue and muscle cells is not simple. A trichrome stain, similar to the Mallory stain, helps to solve this difficulty.

The more enlarged uteri are studied, the more apparent it becomes that various gradations of hypertrophy are encountered in most instances and that pure subinvolution or true diffuse hypertrophy or hypertrophy due solely to metritis or to endocrine disturbance is unusual.

Curettage may be required for differential diagnosis, and, strangely enough, it is sometimes beneficial. If more important surgical intervention is required, one should hesitate to perform corrective operations for uterine displacement in these cases unless childbearing is an important issue; removal of the offending organ by subtotal or complete hysterectomy is the procedure of choice.

EDWARD L. CORNELL, M.D.

Waterman, G. W., and DiLeone, R.: Treatment of Carcinoma of the Cervix with Interstitial Radium Needles at the Rhode Island Hospital. *Am. J. Obst.*, 1945, 50: 482.

The authors report, first, the 10 year survival rates on 309 cases from 1926 through 1933, which were previously reported for five-year survivals; second, they add a new series of 198 cases which passed through the Clinic from 1934 through 1938; and, third, they review the total of 507 cases from 1926 through 1938.

An improvement in the results in the last three years, from 1936 through 1938, in 127 cases is shown.

The effect of age on the extent of growth when first seen (clinical stage) and on the prognosis (five-year survival rate) is shown.

The incidence of adenocarcinoma, carcinoma complicating pregnancy, bone metastases, generalized metastases, and cancer primary in a second organ is given for this series.

TABLE 1.—SURVIVAL RATE BY YEARS 1 TO 10 FROM 1926 TO 1933—309 CASES

Stage	(Schmitz) per cent	No. cases	5 Yr. survival	per cent	10 Yr. survival	per cent
I	4.8	15	11	73.0	7	46.0
II	31.7	98	53	54.0	39	40.0
III	35.6	110	36	32.0	23	21.0
IV	27.9	86	0	0.0		
Composite	100	309	100	32.3	69	22.3
Relative		281	100	35.7	69	24.5

TABLE 2.—FIVE-YEAR SURVIVALS—127 CASES FROM 1936 TO 1938, LAST 3 YEARS

Stage	(Schmitz) per cent	No. cases	1 Yr.	2 Yr.	3 Yr.	4 Yr.	5 Yr.	5 Yr. per cent
I	2.3	3	3	3	3	3	3	100.0
II	30.0	38	34	29	27	27	26	69.0
III	48.0	61	42	30	21	18	18	28.5
IV	19.7	25	8	3	3	3	3	4.2
Absolute	100	127	87	65	54	51	50	39.3
Not treated	14.3	18					1	
Relative	85.7	109					49	44.9

18 cases—needles not used as primary method. One treated elsewhere survived 5 years.

The good results previously reported from the use of interstitial long platinum needles of low intensity are maintained in this series, and, with the added use of x-ray therapy in the last consecutive 109 treated cases, are definitely improved.

Through a more carefully worked out distribution and spacing of the radium sources, as suggested by a study of dosage and five-year survival rates, it is hoped that these results may be further improved.

EDWARD L. CORNELL, M.D.

ADNEXAL AND PERIUTERINE CONDITIONS

Ziegler, E. E.: Bilateral Ovarian Carcinoma in a Fetus 30 Weeks Old. *Arch. Path.*, Chic., 1945, 40: 279.

This is a case report of a carcinoma which apparently was a dysgerminoma arising from granulosa cells in a fetus weighing 1,340 gm. and estimated to be thirty weeks old.

At the routine autopsy, the ovaries were slightly enlarged and grayish pink in color. They aroused no special interest during the autopsy and the tissues were removed and sectioned routinely. Histological examination, however, showed that the entire substance of each gland was practically replaced by carcinomatous tissue. The cancer cells contained numerous mitotic figures. Scattered through the neoplasm were numerous primitive graafian follicles. In some places the granulosa cells seemed to show stages of transition into neoplastic cells. This gave the impression that the tumor was a granulosa cell carcinoma. The tumor cells themselves, however, resembled those of dysgerminoma, and there was a delicate tumor stroma between the masses of tumor cells which also resembled the stroma of the well known dysgerminoma. There were no gross or microscopic evidences of extension or metastases.

The mother of this infant is living and well and has since given birth to a full term, well developed, normal appearing infant.

The occurrence of neoplasia in childhood, in infancy, and now in fetal life seems to lend weight to the opinion of those who believe in the importance of hereditary as opposed to environmental factors in the causation of cancer. It seems to indicate that at least some cancers may occur without the operation of extrinsic environmental factors.

SAMUEL J. FOGELSON, M.D.

MISCELLANEOUS

Grellet, H. E.: The Use of Prostigmine in the Treatment of Amenorrhea and as a Pregnancy Test (De l'emploi de la prostigmine dans le traitement de l'amenorrhée et comme test de grossesse). *Rev. fr. gyn. obst.*, 1945, 40: 250.

Emmenagogues such as apiol, ergot, and yohimbine were formerly used to start menstruation because they produced congestion in the pelvic organs. They have been replaced by sexual hormones, but recent studies again focus attention on

the rôle of hyperemia in the mechanism of menstruation. It has been shown that hormones produce histological transformation of the uterine mucosa which the older drugs were not able to cause, but the ability to create hyperemia and uterine bleeding is common to both groups of drugs. Estrogenic hormones have a double effect: (1) a specific action and (2) a nonspecific action related to the phenomenon of hyperemia. Both male and female sexual hormones display a vasomotor effect, attributable to the ability to liberate a certain amount of acetylcholine which acts on the blood vessels through the parasympathetic system. Acetylcholine is produced *in situ* and not in remote places. Such effect is of short duration, not exceeding 12 hours, because a hydrolytic disintegration of the acetylcholine occurs under the influence of the enzyme cholinesterase present all along the nerve fibers.

Many authors consider that the menstruation results from a vasodilating reflex comparable with erection. Retardation of the menstruation without apparent cause may be attributed to a nervous factor responsible for an insufficiency of the vascular response, with a glandular system intact. To remedy such conditions, prostigmine has been suggested instead of acetylcholine, because it acts on the parasympathetic system by inhibition of the cholinesterase, without the dangers associated with acetylcholine. In this manner a rapid disintegration of acetylcholine in the tissues is inhibited and thus a uterine hyperemia is facilitated.

The author employed prostigmine in 86 patients and could check the results in 75. A menstrual delay of from 5 days to several weeks was recorded in the histories. The material consisted of 30 cases of pregnancy, 10 nonpregnant cases in which endocrine or organic disorders could be excluded and the amenorrhea had to be considered as accidental, and the remainder, in which the patients had probable or manifest endocrine disorders.

The author concludes from his investigation that three consecutive injections of prostigmine in women who usually have a normal menstruation are followed by bleeding, usually typical menstrual bleeding. In women in whom an organic or endocrine disorder is suspected such prompt result is considerably less frequent and usually appears only if the injections coincide with the luteinic phase. No uterine bleeding occurs if amenorrhea is due to pregnancy. Therefore prostigmine injections may be used as an early diagnostic pregnancy test. If no bleeding follows 3 injections of prostigmine in patients without any evidence of endocrine or organic disorders, the possibility of pregnancy should be considered.

The patient should be informed that the injections will not provoke an abortion.

In 14 nonpregnant patients treated with prostigmine, a bloody show appeared within 6 days after the last injection; in patients with amenorrhea postpartum, the time which elapsed between the injections and the bleeding was long enough to create doubt as to the efficiency of prostigmine.

The author expresses doubt as to the efficiency of prostigmine in amenorrhea caused by endocrine disturbances. JOSEPH K. NARAT, M.D.

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

Bernstine, J. B.: Vaccination during Pregnancy as a Prophylaxis against Puerperal Infections. *Med. Clin. N. America,* 1945, 29: 1495.

The investigator undertook to culture the type of organisms commonly found in puerperal infection, test their effect on laboratory animals, and by means of a vaccine made from the cultures, elevate the immunity of the pregnant woman to such infections.

Cultures were taken from the cervix and endocervix of pregnant women with a sterile cotton swab, placed in a tube of blood agar, and subcultured within 30 minutes. The culture media consisted of 5 per cent defibrinated horse blood agar plates, beef infusion broth, *p*H 7.6, and plain 2.5 per cent infusion agar plates and slants. The common organisms found were the staphylococcus albus, streptococcus viridans, the diphtheroids, nonhemolytic streptococcus and bacillus subtilis.

After a vaccine was prepared, as explained in detail in the original article, 3 groups of mice were inoculated with various strengths of the vaccine. Following the study on mice, 10 female patients in the childbearing period were selected. No reactions occurred in this group; therefore 471 patients attending the maternity clinic at Jefferson Medical College Hospital, Philadelphia, were inoculated. There was no particular selection of the patients and later at the time of delivery it was not revealed which patients had been inoculated.

The initial injection was 1 minim, with subsequent injections of 4, 8, 12, and 16 minims. The number of injections varied from 8 to 30. The majority of patients received their injections from the fourth to ninth month. There was a noted absence of reactions in these women.

In this series of vaccinated patients, 4.2 per cent were morbid during the puerperium, as compared with the nonvaccinated group whose morbidity was 17.1 per cent. This study concluded a series of 973 patients who were vaccinated, 502 having been reported upon in preceding papers.

CATHERINE B. HESS, M.D.

Duran, A.: Axial Torsion of the Myomatous and Pregnant Uterus (Torsion axial del utero miomatoso y gravido). *Bol. Soc. chilena obst. gin.,* 1945, 10: 119.

Axial torsion of the myomatous and pregnant uterus is very rare. The author has found only 2 cases in the literature before he encountered the one reported in this article. This case was in a woman of 38 years who was found to have a nodular myoma of the uterus complicated by a pregnancy of 1½ months. The myoma was removed, the denuded surface covered with bladder peritoneum, and the wound sutured. The woman made a complete recovery and the pregnancy continued without interruption. The other 2 cases are reviewed briefly.

The name axial torsion is not really correct as this would indicate a torsion of the whole organ around its axis, while as a matter of fact there is a rotation only of the body of the uterus around the supravaginal part of the cervix, which is lengthened and softened by the existing conditions. The rotation may be to the right or left and may be as much as 180 degrees, so that the anterior surface of the uterus looks backward. Torsion of a nonpregnant myomatous uterus may be as much as 360 degrees. Factors in the torsion are the weight, volume, and site of implantation of the tumor, and the softening and elongation of the isthmic portion of the uterus brought about by the pregnancy. The torsion causes a sudden, intense pain irradiating over the whole abdomen, accompanied by syncope, a small rapid pulse, vomiting, cold sweat, and dyspnea. The temperature is normal and there is dissociation between the pulse and temperature. Abdominal palpation reveals muscle rigidity and intense sensitiveness. In cases in which the torsion takes place gradually the symptoms are slight.

Operation should be performed as soon as the diagnosis is made, detorsion is generally not difficult, the uterus may be fixed in position by Passeron's hysteropexy or Pestalozza's pelvic hysterectomy, the myoma removed, and the denuded zones covered with peritoneum. If the torsion has caused serious circulatory disturbances, such as extensive extravasations of blood, infarcts, or zones of gangrene, the uterus must be removed. If no great circulatory changes have taken place and the myomectomy has left the wall of the uterus in good condition the pregnancy may continue. However, if the site of implantation of the myoma is very large, or serious nutritive disturbances of the wall of the uterus have taken place the uterus may rupture.

AUDREY G. MORGAN, M.D.

PUERPERIUM AND ITS COMPLICATIONS

Rosenblum, G., Melinkoff, E., and Fist, H. S.: Early Rising in the Puerperium. *J. Am. M. Ass.,* 1945, 129: 849.

The practice of early rising of parturient women dates back to ancient times. Although it was recently stimulated by the wartime shortage of obstetric beds, it did not arise from that emergency. The puerperium, or time of rest given to women in childbed, has varied more widely in the customs of different peoples than any other feature of that great physiological function of woman.

The practice of early ambulation of surgical patients, now a widely accepted procedure and advocated by hundreds of articles in the American and foreign literature, must be considered intimately

related to the practice of early puerperal rising. The objectives and underlying principles of the two are identical.

With a background of favorable evidence in the literature, the task of studying early ambulation in the puerperium was begun. At the outset it was realized that there would be objections both from patients and from the medical profession to the practice of early ambulation. The following objections arose during the course of their study:

The objections of doctors were: (1) fear of medicolegal consequences, (2) fear that episiotomies would break down, (3) fear that there might be too much strain on the pelvic floor, resulting in prolapses and retroversions, (4) fear of excessive postpartum bleeding, and (5) fear that patients would not approve of early rising.

The objections of the patients were: (1) that the procedure was unfamiliar to them, therefore they were not sure it was good, (2) that they needed rest and it might tire them too much to get up, (3) that they were too weak to walk, (4) that arising might make them bleed too much, and (5) that they might "break their stitches."

A group of 582 obstetric patients who were studied were divided into three groups as follows: (1) 247 early risers ambulatory on the first or second postpartum day; (2) 106 intermediate risers, ambulatory on the third or fourth postpartum day; and (3) 229 late risers, ambulatory later than the fourth postpartum day.

The study of bladder function showed a close similarity of the catheterization curves for the three groups. The contention that early puerperal rising may cause excessive bleeding is disproved by the statistics, which show actually less frequent abnormal bleeding in the early group than in the late group. Involution of the uterus was uniformly good in all groups. The fear that early rising would cause a breakdown of episiotomy or abdominal wound incisions is likewise unfounded, only 1 instance of perineal skin separation occurring in the entire series, and this in a patient in the late rising group. More efficient mobilization of the bowels was evident as more than three times as many spontaneous bowel movements occurred in the early as in the late group.

The total number of complications in the entire series was very small, and there was no significant difference among the three groups. As there were no patients having emboli or thromboses in the entire series, the contention of many previous authors that late rising fosters these complications was not proved in this series. However, a study of a much larger series might possibly reveal a lower incidence of these complications in the early risers.

The claim advanced by some obstetricians that early rising may cause later prolapse and retroversions is also disproved. Of the early risers examined at 1 month and at 6 weeks, 28.7 per cent had either a midposition or retroversion of the uterus, while 34.6 per cent of the intermediate, and 24.4 per cent of the later risers had the same positions—relatively similar totals. This indicated that early rising causes no significant alteration in the position of the uterus, at least within a period of from 4 to 6 weeks following delivery. Prolapse did not occur in any patient in the entire series.

The nurses working in the obstetric department reported a decided reduction in the amount of nursing care required for patients rising early. They noted better morale and less discomfort in this group.

Particularly favorable are the reports concerning cesarean sections, in which cases less abdominal distention and discomfort, and a much more rapid convalescence was noted.

No patient in either the early or the intermediate group offered any criticism concerning the early rising, in fact, the majority exhibited enthusiasm. The multiparas especially were impressed, stating that they felt better and stronger than they had after previous confinements, when they had spent a period of from 7 to 14 days in bed.

CHARLES BARON, M.D.

MISCELLANEOUS

Van Wagenen, G.: The Optimal Mating Time for Pregnancy in the Monkey. *Endocrinology*, 1945, 37: 307.

Since the rhesus monkey (macaca mulatta) is the laboratory animal of choice for the study of the physiology in reproduction, any knowledge concerning the optimal mating time for pregnancy is of considerable interest.

The author reports on a series of observations extended over a 5 year period on monkey breeding. During this study a rigorously standardized plan for mating at a particular time in the menstrual cycle was used.

The routine procedure was to place the female, on the eleventh day of her menstrual cycle, in the cage of a male for a period of forty-eight hours. Thirty-two per cent of such matings resulted in pregnancy. Another forty-eight hour mating starting on the thirteenth day of the menstrual cycle resulted in pregnancies in 24 per cent of the cases.

Another series of 25 monkeys were studied and their mating date was delayed to the seventeenth day of the menstrual cycle. These animals were mated more than an average of three times each, eighty times in all, but at the end of 4 months only 1 pregnancy had been effected. In contrast, when the remaining 24 monkeys then were mated on the eleventh day of their next cycle, 7 of them became pregnant.

The author concludes that in this particular monkey the period between the eleventh and thirteenth days of the menstrual cycle is the preferred time for mating.

HARRY FIELDS, M.D.

GENITOURINARY SURGERY

ADRENAL, KIDNEY, AND URETER

Huggins, C. B., and Scott, W. W.: Bilateral Adrenalectomy in Prostatic Cancer. *Ann. Surg.*, 1945, 122: 1031.

Abundant use of plasma transfusions seems to be of great importance in the prevention of circulatory collapse following adrenalectomy in man.

The author states that inadequate therapy after adrenalectomy in man results in early hyperpyrexia and hypotension; the carbohydrate metabolism is not drastically disturbed. In the adrenalless man adequately treated with plasma, adrenal cortical extract, and desoxycorticosterone acetate, these effects were not observed, but addisonian pigmentation occurred on the sixteenth postoperative day, and was progressive.

Complete adrenalectomy in castrate man results in a reduction of 17-ketosteroids to values less than 2 mgm. excreted in the urine daily; total, ketonic, and *alpha* fractions are greatly diminished. Urinary androgens as measured by the comb-growth technique are absent. There is a continued excretion of small amounts of estrogen. In a man who survived complete adrenalectomy for 116 days there was a sustained reduction of alkaline phosphatase activity of the serum but the prostatic cancer progressed, although apparently at a retarded rate. The injection of desoxycorticosterone acetate elevated the blood pressure to normal levels, but hypertension did not occur with massive doses.

The extragonadal androgenic depot in man is the adrenal.

Adrenalectomy is not a practical method of treatment of the failure-group of patients with prostatic cancer treated by antiandrogenic methods.

Three factors, whose presence and significance vary in the human prostatic cancers, may be stated: (1) the testicular androgens; (2) the extragonadal depot; and (3) androgen-dependence or its opposite, adrogen independence. It is not yet possible to define androgen-dependence or -independence in chemical terms.

JOHN A. LOEF, M.D.

Horta, J. S.: The Question of Origin of Grawitz Tumors (El problema del origen de los tumores de Grawitz). *Arch. espan. urol.*, 1945, 2: 115.

There is no unanimity of opinions as to the origin of Grawitz tumors but at present there is more and more tendency to accept the renal theory. Modern biological studies of the functions of tumors originating in endocrine glands justify a revision of the older theories pertaining to the origin of Grawitz tumors.

A priori we may consider Grawitz tumors as originating from a normal structure of the adult kidney. Apparently such neoplasms do not derive from intrarenal inclusions of the suprarenal glands. There are arguments based on morphologic and biological considerations which tend to show that hypernephroma does not originate from aberrant suprarenal glands within the kidney.

Undoubtedly there is a great microscopic similarity between such tumors and the suprarenal cortex. In many cases it is impossible to distinguish microscopically a hypernephroma from the suprarenal cortex: in both, the fat and glycogen are present in very small amounts or they are absent entirely; cellular protoplasm is scanty and fusiform formations are present. Ewing maintains that nondifferentiated cells, frequently found in a suprarenal carcinoma, are not present in the renal glands.

Sarcomatous structures may be present in Grawitz tumors as well as in the suprarenal cortex. The author shares Ewing's opinion as well as that of Apitz who maintains that both Grawitz tumors and those of the suprarenal cortex may have a sarcomatous structure which derives from epithelial cells; the renal epithelium and that of the suprarenal glands are of mesothelial origin.

Frequency of papillae and lucid spaces is characteristic for parenchymatous tumors of the kidney, while in corticosuprarenalomas they are very rare. Such formations in suprarenal cortex tumors are of glandular origin. Under low power both kinds of tumors may look identical, but under high power, cells of renal tumors show a typical vegetative aspect: only the exoplasm is stained while the remaining cytoplasm remains colorless. Large fat droplets may be seen in sections of Grawitz tumors stained with Sudan III while the droplets are very small in corticosuprarenalomas. The vegetative aspect of cells in renal tumors is caused by the accumulation of glycogen. That cellular formations are practically reduced to cytoplasm in corticosuprarenal tumors cannot be denied, but according to the author's opinion such images are secondary.

The fact that hypernephromas do not produce alterations of the sex characteristics of the host is interpreted by some writers as an argument against the suprarenal theory. Not all tumors of the suprarenal cortex are accompanied by such modifications. From the hormonal point of view the cortical tumors may be divided into: (1) those which do not produce hormonal changes, (2) those which are accompanied by an excess formation of estrogens, (3) those with a symptomatology related to the excessive production of metabolic steroids, and (4) those accompanied by an increased excretion of androgens and steroids. To the author's knowledge not a single case of renal hypernephroma with virilism has been reported in the literature.

The presence of numerous vacuoles in suprarenal tumors but not in hypernephromas is stressed.

Contrary to the rarity of aberrant suprarenal nodules of the kidney, aberrant Grawitz tumors are relatively frequent.

The author believes that there are sufficient arguments in favor of the theory which claims that Grawitz tumors do not originate from suprarenal tissues.

Renal hypernephroma belongs to the group of neoplasms of the endocrine glands characterized by the presence of lucid cells, such as benign corticosuprarenal tumors, luteinomas or hypernephromas of the ovaries, tumors of the interstitial gland of the testes, and parastrumas.

Hypernephromas of the kidney are sometimes accompanied by hypertension but it has been pointed out that no definite relations exist between these two conditions; hypertension may persist after nephrectomy has been performed on account of the presence of a Grawitz tumor.

Hypernephromas possibly originate from myoepithelial formations described by Goormaghtigh, who considers them as regulators of the circulation within the glomeruli. JOSEPH K. NARAT, M.D.

Santaella, R. A.: Voluminous Pyonephrosis and Its Treatment (Las pionefrosis voluminosas y su tratamiento). *Arch. espan. urol.*, 1945, 2: 2.

The author advocates a nephrectomy in two stages in the treatment of extensive pyonephrosis. His clinical observations and anatomopathological studies demonstrated the advisability of such staged procedure. Perifocal sclerotic reaction safeguards against a spreading infection by establishing a defensive blockade. Usually 1 month is allowed to elapse between the first stage, which consists of nephrostomy and insertion of a Pezzer catheter, and the second stage, the nephrectomy proper. The operation is performed only if the functional capacity of the kidney is good. The hilus is ligated en masse. Frequently the author leaves a clamp on the pedicle for 2 weeks.

Six cases in which two stage operations were performed are described in detail.

JOSEPH K. NARAT, M.D.

Castro, E. P.: Renal Tuberculoma (Tuberculoma renal). *Arch. espan. urol.*, 1945, 2: 59.

The author reports a case of renal tuberculoma in a 34 year old man who had repeated attacks of pain in the hypogastrium, combined with a great frequency of urination. The pains would disappear after the application of heat. The last attack was complicated by an intensive hematuria with blood clots, chills, and fever. All the symptoms disappeared after the administration of pyridium. Three months later the patient was admitted to the hospital. X-ray studies disclosed a dense, homogeneous, well circumscribed shadow extending from the right hilum region to the diaphragm. There was a clear space in the center of the shadow. Hematological and bacteriological studies established the diagnosis of pulmonary abscess. The patient was treated with short waves.

The expectoration and fever subsided and the second roentgenogram showed evidence of cicatrization of the pulmonary abscess and the existence of bronchiectasis in the right lower lobe. The patient complained of vague pains in the left renal region and the epigastrium. The urine contained a large amount of pus. Chromocystoscopic examination showed a normal function of the right kidney while after the injection of indigocarmine only very pale fluid was escaping from the left ureter. Retrograde pyleography showed a large cavity above the upper calyx, with irregular outlines; after intravenous urography an image of the cavity in the left kidney was obtained.

A nephrectomy was performed with great difficulty on account of adhesions around the upper pole of the kidney. The patient made an uneventful recovery.

The histological examination revealed a tuberculoma of the kidney with numerous Langhans' giant cells, epithelial cells, and lymphocytes. There was an intensive sclerotic reaction. The glomeruli had undergone a hyaline degeneration. Extensive necrotic zones were spread throughout the entire renal tissue in the involved region.

The symptomatology and the roentgenographic studies pointed to a renal neoplasm. The inspection of the extirpated kidney also suggested a tumor rather than renal tuberculosis.

A check-up 2 years later showed the patient to be in perfect health. JOSEPH K. NARAT, M.D.

Gorro, A. P.: Partial Nephrectomy (Nefrectomia parcial). *Arch. espan. urol.*, 1945, 2: 29.

A partial nephrectomy is indicated when a circumscribed area of the kidney is involved, the remaining parenchyma appears normal, and the excretory pyeloureteral portion is not affected. An excessive mutilation of the organ in such cases is not justified.

Partial nephrectomy, advocated by a number of older writers, was later discredited on account of operative or postoperative hemorrhages, and the formation of obstinate urinary fistulas which required an ultimate extirpation of the organ. Furthermore, improper indications such as the presence of a malignant neoplasm or of tuberculosis of the kidney also discredited the operation.

Recent advances in urological diagnosis, such as urographic studies, and improvement of the technique rehabilitated the operation.

Experiments on animals show that a portion of the renal parenchyma corresponding to one-fourth of the entire amount of both kidneys is sufficient for the survival of the animal. An extirpation of a portion of the kidney does not unfavorably alter, but rather improves, the function of the remaining part of the kidney.

A decision to resect only one part of the kidney cannot frequently be made until the surgeon is able to inspect the organ. Conditions of the blood supply and permeability of the pyeloureteral system are the most important factors to be considered. Aortic arteriography before the operation may furnish valuable information as to the blood supply to the

kidney. Pyelography furnishes information as to the condition of the excretory pyeloureteral apparatus.

Partial nephrectomy is indicated in a partial hydronephrosis located at one of the poles of the kidney. If lesions caused by a stone are extensive, a simple extraction of the calculus does not assure anatomic restitution of the involved parenchyma and in such cases a partial nephrectomy furnishes excellent results because it prevents an extension of the inflammatory process. A partial nephrectomy is indicated if a large solitary cyst is present.

If a hydatidiform cyst does not communicate with the excretory ducts, a partial resection of the kidney may be considered. If in a polycystic kidney the changes are confined chiefly to one portion of the organ, the affected area may be removed and the cysts disseminated over the surface of the kidney may be destroyed with the cautery.

Sometimes abnormal blood vessels interfere with pyeloureteral evacuation and in such cases a section of the abnormal blood vessels which may lead to an ischemia of the corresponding part of the kidney may be avoided by a prophylactic partial nephrectomy. Otherwise a septic necrobiosis may result.

If a destructive renal infection is confined to one portion of the organ, the affected area may be resected and a drain inserted.

Only on rare occasions is a partial nephrectomy indicated in renal tuberculosis. This may be the case if the infection affects a kidney with a double pyeloureteral system which permits a functional and roentgenographic study of both portions of the kidney. Such studies may reveal an integrity of one part of the kidney.

Anomalies of the renal pelvis with or without infection may show that two parts of the kidney function independently of one another. In such cases a plastic pyeloureteral operation, when there is a congenital anomaly, may supplement a partial resection of the kidney. Such an operation may be considered if a benign neoplasm involves only one part of the kidney.

In many cases of injury of the kidney a partial resection of the organ is justified.

One of the drawbacks of a partial resection is the hemorrhage; this can easily be stopped with the electrocautery. The second drawback is the difficulty encountered in the determination of the extent of the lesion. Roentgenographic studies are extremely valuable in this respect.

A few essential points in the technique must be kept in mind. The blood vessels supplying the portion to be resected should be ligated prior to the resection, especially if one is dealing with an abnormal kidney. Many authors described a technique of approximation of the wound edges. However, in many instances the wound in the kidney cannot be closed without an insertion of a flap consisting of muscle tissue and aponeurosis. Such portions of the tissues may be obtained from the external oblique muscle. Difficulties in approximating the edges are encountered when a transverse or a wedge shaped incision is made in the kidney. The inserted musculoaponeurotic strip is kept in place with interrupted catgut sutures. The author uses interrupted catgut sutures for approximation of the edges which transfix the parenchyma and the fibrous capsule.

Efficient extrarenal drainage for from 8 to 12 days provides evacuation of the extravasated urine. Otherwise an infiltration of the soft tissues with abscess formation may result.

The author performed a partial nephrectomy on 16 patients. He encountered the following anatomic abnormalities: a superior polar artery, both superior and inferior polar arteries, double renal pelvis, and a normal kidney with a double pelvis and ureter. The following pathological conditions were found: pyelonephritic infection, hypoplasia with a complete double ureter, tuberculosis of a kidney with a double pelvis and ureter, congenital ureterohydronephrosis with a double pelvis and ureter, infected hydronephrosis with a double pelvis, calculous pyonephrosis with a double pelvis, lithiasis with infection, tumor of the kidney, hydronephrosis, inferior polar artery, circumscribed dilatation of a calyx, and traumatic rupture of the kidney.

In 5 cases transparenchymal drainage of the renal pelvis was employed. In 4 cases the urine was escaping from the lumbar incision for a few days following the operation. In 2 patients the urinary discharge stopped spontaneously between the fifth and tenth postoperative days, while in the remaining 3 cases the discharge lasted from 3 to 4 weeks. In 1 patient a urinary fistula opened and closed repeatedly for a few months until a small stone was expelled spontaneously. In 1 patient symptoms of an acute pyelonephritic infection developed. The condition was attributed to a premature removal of the intrarenal drain on the tenth postoperative day. Following the introduction of a ureteral retention catheter the infection subsided in 20 days.

JOSEPH K. NARAT, M.D.

Frostad, H.: Urinary Stasis and Pains after Cystoscopy with Catheterization of the Ureters. *Acta chir. scand.*, 1945, 92: 546.

Frostad studied 95 cases in which preliminary intravenous pyelography excluded urinary tract calculi and in which pain or colic followed retrograde pyelography. After ureteral catheterization patients frequently complain of pain, and the urine from one or both ureters is bloody. Postcystoscopic intravenous pyelography demonstrated a characteristic urinary stasis on the affected side. In 3 cases removal of a blood clot, projecting from a ureteral orifice, resulted in immediate cessation of the pain. In the series, cases with reduced renal function were excluded.

Postureteral catheterization pain usually starts in one or both lumbar regions and in 2 to 3 hours gradually spreads downward along the course of the ureter to the inguinal regions. The pains may vary in intensity, corresponding to ureteral peristalses. They seldom begin quite suddenly as in calculous

colic, but begin and decrease gradually. They usually begin a few hours after completion of the cystoscopy. Of the 95 patients, 33 had postcatheterization pain. Pain usually occurred when bleeding was most excessive during collection of the ureteral catheter specimens. A fairly constant relationship between the intensity of the pain and the amount of bleeding during collection of the specimens was present.

Of the 33 patients with postcatheterization pain, 28 had intravenous pyelography immediately after commencement of the pain. In all cases, more or less complete stasis on the affected side was found, and the duration of the stasis varied from 2 to 6 hours. When the pains disappeared, the stasis discontinued at once. Among 19 cases without pain, intravenous pyelography did not demonstrate stasis in any instance. Other causes of stasis, such as calculi, ureteral rupture, gravidity, adjacent tumors or abscesses, and allergic reactions, would have been ruled out by the preliminary intravenous urography.

The most probable cause of stasis is the formation of blood clots which for a time obstruct the ureter after ureteral catheterization.

DAVID ROSENBLOOM, M.D.

Prince, C. L.: Lumbar Ureterolithotomy; The Foley Operation. *J. Urol.*, Balt., 1945, 54: 368.

The intention of Prince is to bring to the attention of the surgical profession the simple operation of lumbar ureterolithotomy which was introduced in 1935 by F. E. B. Foley. The author believes that this simple procedure with no cutting of muscles, without freeing of the ureter, with ease of exposure, and with rapid convalescence has been neglected by the profession.

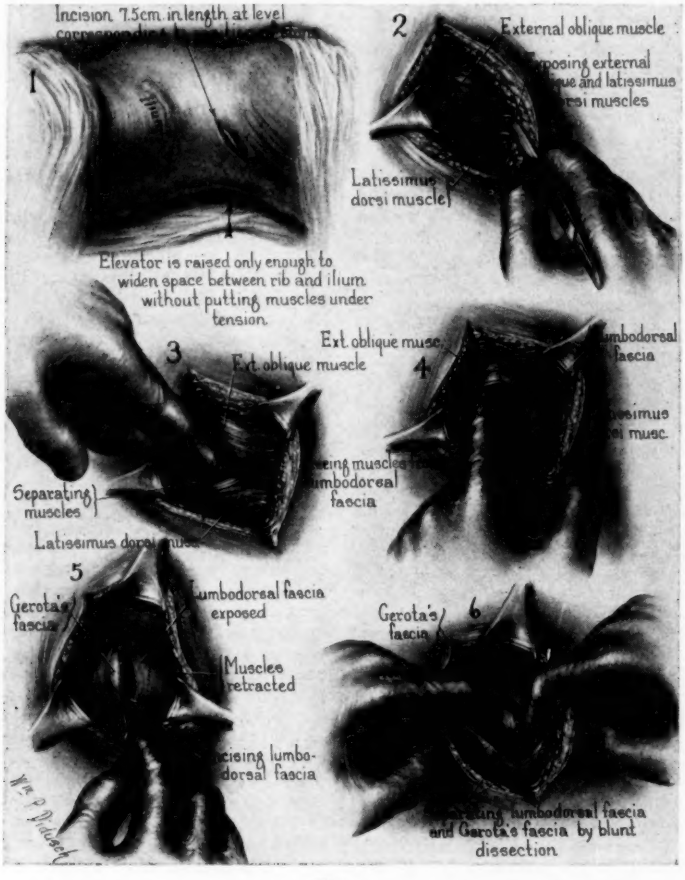

Fig. 1.

Details of the operative technique including excellent illustrations by Didusch are given (Figs. 1 and 2). Briefly, exposure of the ureter in its upper third consists of making a short (7 or 8 cm.) incision parallel to the twelfth rib with the midpoint of the incision at the end of the twelfth rib and at a distance below the rib equal to the distance of the ureteral stone below the twelfth rib as determined with x-rays. Dissection is carried downward to the lumbodorsal fascia by bluntly separating the latissimus dorsi posteriorly and the external and internal oblique anteriorly, and stripping these muscles from the lumbodorsal fascia below. The lumbodorsal fascia is then opened in the direction of its fibers and the fascia of Gerota stripped from its under surface. The posterior layer of Gerota's fascia is separated bluntly from the quadratus lumborum and psoas muscles down to the vertebral bodies. At this point, the ureter can be seen and opened, the stone removed, exploration made with bougies; closure is easily accomplished. It consists of suture of the muscularis and periureteral tissues with interrupted fine catgut and then suture of the lumbodorsal fascia, subcutaneous tissue, and skin. A Penrose drain is placed for 2 or 3 days. The muscles do not require suturing.

Convalescence in these cases has been smooth. There has been no shock or mortality. The average hospital stay following the Foley operation in 14 cases reported by the author was 7 days. During the usual muscle splitting and cutting procedure for stones in the upper third of the ureter, the average hospital stay in 14 comparable cases was 18.4 days.

WILLIAM W. SCOTT, M.D.

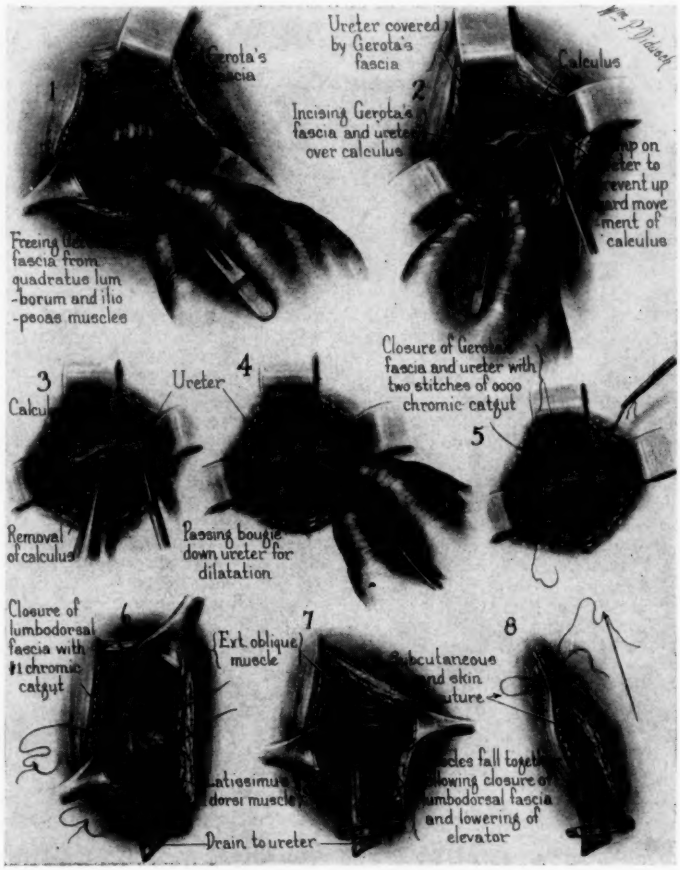
Ureter covered by Gerota's fascia
Calculus
Incising Gerota's fascia and ureter over calculus
Freeing Gerota's fascia from quadratus lumborum and ilio-psoas muscles
Closure of Gerota's fascia and ureter with two stitches of 0000 chromic catgut
Ureter
Removal of calculus
Passing bougie down ureter for dilatation
Closure of lumbodorsal fascia with #1 chromic catgut
Ext. oblique muscle
Drain to ureter
and lowering of elevator

Fig. 2.

BLADDER, URETHRA, AND PENIS

Ballesteros, M.: Cystometry (La cistometria). *Rev. urol.*, 1945, 3: 206.

After a brief historical review of cystometry and a short description of the anatomic, pathological, and physiological conditions of the bladder, the author describes various models of apparatus used for cystometric measurements and the technique of cystometry.

Cystometry is of great importance for the discovery of disturbances of the bladder function of neurogenic type or those caused by a reflex from adjoining organs. The method is particularly valuable in cases in which locomotor ataxia is combined with hypertrophy of the prostatic gland.

The average figures obtained by the author differ somewhat from those published by North American workers. According to the author's investigation the pressure curve indicated a normal capacity of the bladder of from 150 to 300 c.c. The maximal voluntary pressure in normal individuals ranges from 32 to 62 mgm. of mercury. In hypertonic individuals the capacity of the bladder is below 150 c.c. and the maximal voluntary pressure exceeds 62 mgm. of mercury, while in hypotonic individuals the bladder capacity exceeds 300 c.c. and the maximal voluntary pressure remains below 32 mgm. of mercury. In normal individuals the curve ascends gradually, while in hypertonic individuals it rises rapidly and in hypotonic patients it is low. The maximal physiological capacity of the bladder ranges from 200 to 700 c.c. Among cystometrographs, the one devised by Lloyd G. Lewis is the most precise instrument; the electrocystometrograph of Landes and Voris is also a dependable apparatus.

Sphincterometric measurements are also of great importance as they supplement cystometric studies.

The most complete cystometric apparatus is the so-called microcystometer devised by Irving Simons.

The author discusses various sources of error, such as infection of the bladder; excessive rapidity of the injection of the fluid; rectocele, cystocele, and diverticula of the bladder which may produce a hypotony of the detrusor muscle; stones in the bladder; and tumors or infectious processes which may produce hypertonia. JOSEPH K. NARAT, M.D.

Leifer, W., Martin, S. P., and Kirby, W. M. M.: The Treatment of Gonococcal Urethritis with Single Injections of Penicillin-Beeswax-Peanut Oil Mixtures. *N. England J. M.*, 1945, 233: 583.

The procedure and materials used for the treatment of gonococcal urethritis were essentially the same as those described by Romansky and Rittman in 1944 (*Science*, 100: 196). The viscid preparation —even when heated in an incubator, or in a water bath at 37° C. for 30 minutes—was withdrawn into a syringe by a 15-gauge needle and then injected into the buttock through a 20-gauge needle. The site of injection was not massaged. No local or systemic manifestations of toxicity of any significance were noted. In most cases pain and tenderness were present at the site of injection for from 24 to 48 hours, but these were no more severe than when penicillin in saline solution is used.

In every patient treated in this series clinical improvement was noted initially; dysuria subsided during the first six or eight hours, and the purulent discharge became mucoid and watery. By the end of the second day almost every patient was free of symptoms and the urethral discharge had ceased.

One hundred and ninety-two patients of the total of 217 whom the authors treated by this method could be followed up for 21 days, and only these were considered in evaluating the results. In 24 of these treatment resulted in failure; however, there was a clinical recurrence with the return of urethral discharge, from which gonococci were cultured in only 10; in the other 14 the gonococcus was detected by bacteriological methods alone. All of the 24 patients in whom treatment was considered a failure were eventually cured by further penicillin-beeswax-peanut oil therapy or by treatment with divided doses of penicillin in saline solution.

In reviewing these results, no noteworthy effects due to the character of the excipient used, e.g., the percentage of beeswax used, or the salt of penicillin employed (calcium or sodium) were noted, nor did the race of the patient (negro or white) make any difference, although the white patients were found to be slightly more refractory. Of the total 192 in the series who were followed up for 21 days, 88 were treated with 100,000 units of penicillin, and of these 74 (84%) were cured; 91 were treated with 300,000 units and of these 83 (91%) were cured. The remaining 13 patients were given 200,000 units and of these 11 were cured; however, the last group was too small to be significant.

From these results the authors conclude that a single intramuscular injection of 1.0 c.c. of a mixture containing 300,000 units of penicillin in 4 to 6 per cent beeswax by volume in peanut oil appears to be a highly satisfactory method of treating acute gonococcal urethritis. JOHN W. BRENNAN, M.D.

Castro, E. P.: Epithelioma of the Urethra; Navicular Fossa (Epitelioma de uretra; fosa navicular). *Arch. espan. urol.*, 1945, 2: 140.

The author collected 28 cases of epithelioma of the urethra from the literature and reports a case of his own in a man, aged 48 years, who had noticed an enlargement of the glans 8 months prior to the admission to the hospital. Simultaneously a hemorrhagic secretion began dripping from the meatus. Gradually burning pains developed and were responsible for impotence because they were interfering with erection.

There was a very marked phimosis. Palpation showed the glans to be transformed into a globular hard mass, painful to the touch. The local temperature was increased. A sanguineous secretion was escaping from the urethra. A catheter could not

be introduced because it was encountering a mass just behind the meatus. The testes and epididymes were normal and no enlarged inguinal glands could be palpated. The Wassermann reaction was negative.

A biopsy was performed and the examination of the piece removed from the endourethral mass established the diagnosis of a spinocellular epithelioma.

An operation was performed under low spinal anesthesia. The involved portion of the penis was removed. An inspection of the specimen showed the entire navicular fossa to be occupied by a cauliflowerlike neoplasm.

Histological examination showed a malignant neoplasm consisting of the squamous type of epithelial cells which were penetrating the skin and forming numerous ramifications and anastomoses. The stroma was relatively scant. A hyaline degeneration of the epithelium was noticed in many places and there was evidence of a chronic inflammatory reaction in the stroma in the form of an infiltration with plasma cells, lymphocytes, and a few polynuclear cells. Mitoses were relatively few.

Urethral epithelioma usually causes severe pain which interferes with micturition and sexual power. The frequency of urination may be increased or a complete retention may develop. The latter may disappear when necrosis of the tumor re-establishes free passage. As a rule, symptoms of periurethritis accompany the induration. In doubtful cases a urethroscopic examination may be required. Biopsy allows the differentiation of an epithelioma from adenomafibroma, fibroma, or fibromyoma, while serological examinations exclude syphilitic lesions. Inguinal adenopathies are relatively frequent.

Chronic inflammatory strictures, fistulas, and leucoplakia are considered as predisposing factors. In 60 per cent of the cases the tumor has been found in the perineal portion of the urethra.

The tumor may be either nodular or infiltrating. Both types show a considerable peripheral growth. Necrosis of the tumor tissue may lead to the formation of periurethral abscesses.

Metastases are found in the inguinal, epigastric and mesenteric regions.

Cylindrical cell formations or adenocarcinomas deriving from Littre's glands are rare and in the majority of cases a squamous-cell tumor is found. This is due to the frequent metaplasia of cylindrical urethral epithelium.

The therapeutic method of choice is an amputation of the penis if the epithelioma is located in the anterior urethra. Involved inguinal glands should be removed. A removal of the testes is superfluous because they have an entirely independent lymphatic circulation.

The prognosis is much worse if the epithelioma involves the posterior urethra, while chances of cure are reasonably good if the tumor is confined to the anterior portion.

An early diagnosis is essential.

JOSEPH K. NARAT, M.D.

GENITAL ORGANS

Boyd, H. L.: The Use of Thrombin (Topical) in the Control of Bleeding Associated with Prostatic Surgery. *J. Urol.*, Balt., 1945, 54: 385.

Boyd suggests the topical use of thrombin for the control of bleeding during and following perineal prostatectomy in the cases in which bleeding cannot be controlled by ligation of the bleeding points and the supplementary use of the Davis bag and gauze packing. In his introductory remarks, Boyd reviews the previous successful use of thrombin by O'Conner in cases of excessive hemorrhage following transurethral electroresection and suprapubic prostatectomy.

In 12 cases of excessive bleeding following perineal prostatectomy in which control by ordinary means proved impossible, thrombin was used. The technique is given in detail and consists, briefly, of the application of a gauze sponge (2 inches long) soaked in thrombin solution (5,000 units in 10 cc. of normal saline solution) to the bleeding areas within the prostatic capsule, the sponge being brought out of the wound beside the Davis bag.

In 1 case in which the Davis bag became partially deflated and passed into the prostatic bed, profuse bleeding was controlled by clamping the Davis bag, introducing the thrombin solution through the urethra, clamping the urethra, and permitting no irrigation and no catheter drainage for a period of 4 hours.

In 1 case excessive bleeding was controlled with thrombin introduced and localized to the prostatic space by means of the Trattner partition catheter.

WILLIAM W. SCOTT, M.D.

Millin, T.: Retropubic Prostatectomy; a New Extravesical Technique. *Lancet*, Lond., 1945, 249: 693.

The outstanding features of retropubic prostatectomy are:

1. It is an extravesical procedure, by which suprapubic bladder drainage with its risk of slow closing or persistent fistula is avoided.

2. It is applicable to all types of prostatic obstruction.

3. It is relatively short and shock free.

4. It appears to be anatomically sound, no important organs being interfered with or endangered.

5. The mortality is singularly low. No deaths have occurred in the first 20 cases.

6. The postoperative course is easy for the patient and attendant staff.

7. The whole of the obstructing tissue is removed; so the risk of recurrent obstruction is obviated.

8. The postoperative stay in the hospital seldom exceeds 2 weeks.

Preoperative treatment. When the signs or symptoms suggest the necessity or desirability of operative intervention, the usual preliminary tests of renal and cardiovascular functions are made. Particular emphasis is laid on preliminary intravenous

Fig. 1. Retropubic approach to the prostate; P, pubis; B, bladder; R, retractor.

urography. From this study is ascertained evidence of ureteric dilatation, unexpected gross hydronephrosis, vesical diverticulum, urinary calculi, and approximate residual urine, without the necessity of urethral instrumentation. When actual retention has supervened, suprapubic puncture is being tried initially with a small hydrocele trocar and cannula, and repeated when necessary until renal function studies have been made. When the initial puncture reveals infected urine, a No. 8 rubber Tiemann catheter is passed per urethram and retained *in situ*. When the urine is uninfected and renal function adequate, urethral instrumentation is not used before the patient is on the operating table.

Operative technique. The patient having been anesthetized either by low spinal anesthesia, with pentothal, or with pentothal and gas-oxygen, as indicated, a rapid cystourethroscopic examination is made to rule out unexpected bladder pathology and to study the exact configuration of the gland. The bladder is emptied, and, while the surgeon is changing his gloves and gown, the assistant prepares the operative field, i.e., the lower abdomen and penis. The penis is covered with a loose sterile towel. A midline incision is made, starting over the pubis and extending upward 2½ or 3 inches, according to the obesity of the patient. This is deepened in the usual manner and the aponeurosis is incised in the whole length of the wound. Bleeding points are caught in hemostats and coagulated with the diathermy needle. The recti are then separated in the midline, and the index finger, inserted at the lower extremity, sweeps the retropubic fat and peritoneal fold upward. A modified Harris self retaining retractor is then introduced. The lateral blades keep the recti widely separated, and the posterior blade presses the bladder upward and backward (Fig. 1).

A flexible lamp resting on the pubis is dipped into the retropubic space thus opened up, and the distribution of the veins coursing upward on the anterior and lateral aspects of the prostate is noted, as this appears to vary considerably. The veins are situated in the prevesical layer of the endopelvic fascia. The central leash arising from the deep dorsal vein of the penis is underrun with the boomerang needle and ligated. The group on each side is similarly treated. The fat still adherent to the lateral aspects of the gland is gently sponged downward and outward, any veins inadvertently torn in this process being promptly seized with hemostats and subjected to diathermy. The anterior and lateral surfaces of the gland being cleared in this way, a medium sized swab is pushed into each lateral recess.

With a diathermy knife or No. 15 Bard Parker knife a curved transverse incision, convex downward, 1 cm. distal to the bladder neck, is made through the prevesical fascia and true prostatic capsule. Suction is maintained to keep the field dry and to enable the operator to grasp any bleeding vessels in the distal lip with curved Kocher forceps. With these forceps used as tractors the lower flap is undermined toward the apex of the gland with Devine's long dissecting scissors. The Kocher forceps are removed after being touched with the diathermy needle. The upper flap retracts because of the pull of the severed pubovesical muscles. The anterior and much of the lateral aspects of the false capsule now being exposed, an inverted V incision is carried down to the adenoma, which is readily recognized by its typical whitish appearance. The V shaped flap is elevated, which opens up a lozenge shaped space. With the closed curved dissecting scissors the lower margins of the lateral lobes are freed from the false capsule. The dissection may be continued with the scissors, or, as the author prefers, with the finger. For this purpose it is best to remove the retractor temporarily. The lateral lobes and, when present, the middle lobe, are freed digitally from below upward until they present in the wound, being attached solely in the region of the bladder neck. The pedicle is seized on each side with Kocher forceps and the adenomatous mass is detached with scissors or the diathermy needle. The forceps are touched with the diathermy needle and removed. In 1 instance only has a steadying finger in the rectum been necessary.

The retractor is now replaced, the field swabbed and sucked dry, and the edges of the false capsule are secured with 4 pairs of Allis forceps. By traction on these and suitable manipulation of the flexible lamp and sucker the prostatic bed is carefully inspected. The two prostatic arteries, if not already secured in the pedicle, are easily seen bleeding close to the bladder neck at 5 and 7 o'clock. They are seized with hemostats and coagulated. Any other obvious bleeding vessels are similarly treated. This exposure enables one to see tags or small adenomas not infrequently left behind during enucleation by any route. They are detached with scissors.

Bleeding having been controlled, the towel covering the penis is then raised and a No. 18 Harris catheter passed along the urethra into the prostatic cavity and thence guided into the bladder. With the assistant steadying the Allis forceps on the margins of the false capsule, the operator closes the defect with a continuous suture of No. 0 catgut, using the boomerang needle. The transverse incision

in the true capsule is then approximated over this with 3 or more interrupted No. 0 catgut sutures. All obvious bleeding should now have been controlled. The lateral recess packs are removed, the field is gently swabbed dry of clot and sprayed with sulfanilamide powder, and a small corrugated drain is placed down to the suture line. The self-retaining retractor is removed and the rectus sheath closed with interrupted No. 2 catgut sutures. The skin is closed with silkworm gut. Bilateral vasectomy is then performed. The catheter is next irrigated with 1/5000 flavine to free it from any clot it may have collected during its passage through the prostatic bed. Four ounces of fluid are left in the bladder, and the catheter is spigoted. Two silkworm sutures fix the catheter to the skin of the penis. A 4 foot length of sterile tubing with a glass connection of even bore is then attached to the catheter, the lower end of the tubing being spigoted. The operation time need not exceed half an hour, and is often nearer 20 minutes.

JOHN A. LOEF, M.D.

MISCELLANEOUS

Cordonnier, J. J.: Vesicoureteral Reflux Accompanied by Renal Colic. *J. Am. M. Ass.*, 1945, 129: 662.

The role of vesicoureteral reflux in the production of renal colic was brought to our attention by Lewis and Caroll in 1934; all cases described by them were secondary to vesical neck or urethral obstruction, and the typical renal colic occurred in the presence of a distended bladder when the patient attempted to void.

Diagnosis is established by filling the bladder with an opaque solution, taking an x-ray film, having the patient void, and then taking a second film.

The etiological factors are: (1) mechanical obstruction of the vesical neck with upward dilatation and alterations of the ureteral orifice due to chemical, inflammatory, and postoperative changes; (2) patent ureteral orifices associated with nerve lesions as in cauda equina lesions; and (3) congenital urethral valves.

Two cases with typical renal colic caused by vesicoureteral reflux are presented.

Vesicoureteral reflux should be suspected in cases of renal colic, particularly if no stone is demonstrable and vesical neck obstruction is present. Postoperative ureterovesical valve cicatrices may be followed by vesicoureteral reflux. A routine cystogram alone may cause a reflux to be overlooked, and a second film, taken after the patient has voided, should be taken.

DAVID ROSENBLOOM, M.D.

Marshall, C. J.: Tubercle Bacilluria. *Brit. J. Urol.*, 1945, 17: 102.

While a series of 11 cases is much too small for statistical analyses, it may, however, bring out a few points of particular interest.

The presenting symptoms of these cases of tubercle bacilluria were the classic triad found in urinary tuberculosis, but in addition the importance of the node in the epididymis was fully borne out. Whether every case of chronic epididymitis should be subjected to full urinary investigation remains for discussion; it would seem, however, that there is one unequivocal indication—the examination of the twenty-four hour specimen for cells and bacilli. This simple but nevertheless searching test should never be omitted. Open tuberculosis cannot fail to make itself evident at least by the presence of leucocytes, if not of bacilli; the presence of either or both, of course, calls for the full roentgenographic investigation with cystoscopy.

There remains the case of closed tuberculosis in which cells are not found in the twenty-four hour specimen; such cases must be uncommon but nevertheless they are on record. Such cases will be missed unless excretory roentgenography at least is performed.

The overwhelmingly important question, however, is that of treatment. In view of the evidence that small lesions do heal, even with calcification, it seems that there is strong justification for a policy of conservatism. Urinary tuberculosis is not a fulminating condition; on the whole it is only slowly progressive, and, further, vesical lesions, in general, present a high degree of recovery once the renal disease is removed. The progress of the condition lends itself to very precise observation; again, repeated examinations of the twenty-four hour specimen provide clear indications for repetition of the cystoscopic and roentgenographic investigations.

Therefore it seems that if conditions in general are favorable and the patient is co-operative in the matter, so-called "expectant" treatment is permissible. Only one further point is to be emphasized; that is, how permanent is the healing of renal tuberculosis? It will be noted that even in this small series there were cases in which healing occurred, only to break down later on, and it was common experience in nephrectomy for gross tuberculosis to find areas of calcification indicating healing in the remote past, with recurrence of extensive destruction. It may nevertheless still be argued that in view of these considerations—ease of control and slowness of progress—the tendency to later breakdown still does not invalidate the soundness of the conservative attitude in simple bacilluria. There was little support for it in the cases presented. Gross tuberculosis was found in each one submitted to nephrectomy, and in 3, the old healing had broken down again; of the conservatively treated cases 1 developed gross renal tuberculosis; and in the others tubercle bacilli were still present in the urine.

JOHN A. LOEF, M.D.

Ward, R. O.: Some Surgical Aspects of Urinary Bilharziasis. *Proc. R. Soc. M.*, Lond., 1945, 39: 27.

Bilharziasis is a disease which produces many important changes in the urinary tract and is, if only for that reason, worthy of the interest of urologists.

Examination of the urine. The most general method of making a diagnosis of bilharziasis hematobia is to examine the last drops of urine passed, or the centrifuged deposit of the urine of the patient, under a ⅔ inch or ⅙ inch objective. No staining is required. The ova with their terminal spines are easily recognized. In the late stages the sclerosed bladder may be palpable in an emaciated patient, and per rectum extensive induration may be found to involve the prostate and vesicles, and all tissues at the bladder base and in the perineum.

The importance of cystoscopy in diagnosis. (1) A solitary examination of the urine for ova is a quite unreliable test, for ova are not continually released from the lesions of the mucosa. (2) Five consecutive morning specimens, the last few drops of the urine being collected and centrifuged, will show either ova or red blood cells in about 85 per cent of the cases, the latter being strong evidence in the mass examination of natives that bilharzia is present. (3) Even in the absence of ova or red blood cells the continual presence of pus or albumin in a native's urine means that a diagnosis of bilharzia is probable until it has been disproved. (4) Cystoscopy is the most accurate method of diagnosis in all active phases of bilharziasis. Moreover, there are several characteristic vesical changes which persist when the active stages of the disease are past. It may be argued that cystoscopy does not reveal lesions of the kidneys and the urethral mucosa; that must be admitted, but it is probably very rarely that these tissues are affected without vesical involvement.

Cystoscopic appearances in vesical bilharziasis. The earliest abnormality seen in the bladder mucosa is the appearance of patches of congestion which occur most commonly in the trigonal region; these, however, have no characteristics which enable a certain diagnosis to be made. Subsequent stages are specific.

The first of these stages is very typical. Bilharzial tubercles make their appearance. Each of these is about as large as the tubercle due to Koch's bacillus (to which it bears some resemblance), that is to say, about the size of a pin's head. It is raised above the level of the mucosa and is surrounded by a narrow ring of congested vessels. It has a shining surface and a faintly yellow color. As it grows and dies the shine diminishes, and the yellow color remains and is sometimes intensified, while the surrounding hyperemia becomes less or may disappear entirely. The bladder mucosa which lies around a collection of these tubercles is sometimes congested but it may be very little different from the normal. When an intense invasion by ova is in progress very marked bullous edema is often produced. It is difficult to say how much of this is a mere reaction to the ova and their toxins, and how much of it is due to venous blockage by the worms, but probably the former is the more important cause.

Calcification of the bladder tissues around the ova is a prominent feature in all severely infected long standing and untreated cases.

One local result of calcification is what is called sandy patches in the mucosa.

The process of calcification affects chiefly the submucous layer of the bladder wall. It is by no means necessarily accompanied by secondary infection, and on cystoscopy in such cases the bladder has often been clean. When this was the case it was usually very pale because of sclerosis and diminution of the vessels. This calcification forms a barrier in which many ova perish, and through which others cannot work their way.

Another stage is the development of a bilharzial ulcer. This may be clean and without sloughs. It is usually single, and Makar says that he has never seen this type of ulcer become malignant. More often secondary infection is coexistant, and in such cases an ulcer, also usually a solitary one, has a sloughing base and marked cystitis is present.

Vesical papillomas due to bilharzia are common in Egypt. This is a true neoplastic condition and frequently malignant. In that country cancer of other organs is uncommon, and these growths are considered to be the result of the "toxins" of the ova. A bilharzial papilloma, unlike a granulomatous mass with which it sometimes may be confused, is, of course, not to be cured by medical treatment. These growths do not have long fronds but are of firm consistency. Usually there are only 2 or 3 of them. The commonest variety of bilharzial papilloma met with in Egypt is of bulbar form and dark red color, although in parts it has a grayish-white appearance due to septic necrosis and to phosphatic deposits in the growth. These growths may spread and in rare cases involve the greater part of the bladder. Nodular infiltrating carcinomas are less common. In the series of 130 cases, 10 were of this variety. This variety has the characteristics with which we are familiar and follows the course common to all bladder carcinomas of this type.

In untreated cases the musculature of the bladder, which is the seat of this disease, tends to be thickened, partly because of hypertrophy and partly because of fibrosis due to the additional development of prostatic and urethral obstruction, resulting from bilharzial changes in those tissues. Despite such obstruction the bladder in these cases often remains contracted, and this renders suprapubic cystotomy very difficult or impossible. Urinary fistulas which are a direct result of the disease produce the same result. They affect all parts, but particularly the floor of the urethral bulb, and are often so numerous and extensive that when the male patient squats to micturate the perineal effect resembles the spraying from the rose of a watering can. These fistulas sometimes track widely.

Vesical calculi are met with in bilharziasis and in rare cases the ova have been found within the stones. These calculi appear to be composed of uric acid and oxalates, and are formed upon debris. Phosphatic calculi are very common when sepsis has become severe. Renal calculi are also encountered, although they are very much less frequent.

Ureteral obstruction of moderate degree is often encountered during the active stage of the disease. In such cases it will disappear when a course of treatment with antimony has had time to kill the worms and thus cause the acute reactive processes to resolve.

Chronic ureteral stricture is a very important and frequently insidious result of bilharziasis which we must be prepared to diagnose and to treat. It affects the lower parts of the duct, for the upper portions lie in an area which is but rarely invaded by the worms. Most of the various pathological conditions which arise in the vesical mucosa may also be encountered in the ureters, but stenosis is the common complication. Although it may sink into relative insignificance in the clinical picture of a native affected by advanced urinary bilharziasis, yet in such patients death from infected bilateral hydronephrosis is common. These strictures, however, are encountered in patients who appear at first sight to have recovered completely from the disease.

Dilatation of an established stricture of the ureter is best effected through an instrument of the McCarthy panendoscope type, with some form of stiff ureteral dilator. Such a method, when possible, is very effective, more so it seems than in any other types of ureteral strictures, and although the case requires further supervision the cure is often complete.

The author does not discuss the general treatment of urinary bilharziasis, or of the later complications of the disease.

Tartar emetic remains the best drug for treatment, despite some unpleasant effects experienced by the patient during the period of administration. The course should amount to a total of 30 gr., and it must be intensive lest the parasites acquire a resistance to antimony. There are also some more recent preparations such as stibophenum, anthiomaline, and fouadin. These are administered intramuscularly; this is of great value in the treatment of the school children of the Delta. These preparations obviously have advantages when large numbers of troops are treated but they are not considered to be so certainly curative as is antimony sodium tartrate. Antimony first sterilizes the generative apparatus of the female worms and ultimately destroys them. It is not known just how certain is the effect upon those ova which have been deposited before treatment was begun.

It will be agreed that we must keep our eyes open for occasional cases of this disease. Not only officers but men of all three Services have been in the countries where this disease is endemic.

JOHN A. LOEF, M.D.

Combes, F. C., Canizares, O., and Landy, S.: Lymphogranuloma Venereum. *Am. J. Syph.*, 1945, 29: 611.

The problem of diagnosis of so-called latent forms of lymphogranuloma venereum has never been solved, and this inability to determine the presence or absence, or the degree of activity of the disease is a serious handicap. Patients considered cured, discharged, and allowed to resume their normal activities frequently have a residual, small, hard mass in the inguinal region which has been interpreted as a fibrotic reaction and a sequela of the reparative process, but there is no proof at present that these patients are definitely cured and that they do not harbor dormant but viable virus in these nodes. The same problem exists in patients with anogenitorectal involvement. A test capable of detecting evidence of activity during these "latent" periods should be invaluable. The Frei reaction persists after convalescence for an indefinite time, and is not an indication of the degree of activity. The complement fixation test of Grace, Shaffer, and Rake is not yet standardized and perfected.

There are definite changes in the blood serum proteins of patients with lymphogranuloma venereum, chief of which is a hyperglobulinemia. The formol-gel test is predicated upon the presence of an increase in seroglobulins, and is not specific for any disease. A rapidly positive formol-gel test indicates a high seroglobulin. The authors made formol-gel tests and albumin-globulin ratio determinations on 42 cases of lymphogranuloma venereum and formol-gel tests on 307 controls. Of the 42 known cases of lymphogranuloma venereum, 38 had positive formol-gel reactions after the disease had been present for three weeks and these were consistently positive after the disease had been present for several months or years, especially in active anorectal cases. Of the 307 controls, only 6 gave positive reactions. The authors conclude that the formol-gel test is a simple reliable bedside procedure of value to determine the presence of hyperglobulinemia in lymphogranuloma venereum. There was a tendency toward a return to normal after a clinical cure in 85 per cent of the cases. Hyperglobulinemia is of some value in determining the degree of activity of lymphogranuloma venereum, and formol-gel reactions and albumin-globulin ratios should be determined in all patients as an aid in treatment and for indication of biological cure.

DAVID ROSENBLOOM, M.D.

Magnuson, H. J., and Eagle, H.: The Retardation and Suppression of Experimental Early Syphilis by Small Doses of Penicillin Comparable to Those Used in the Treatment of Gonorrhea. *Am. J. Syph.*, 1945, 29: 587.

The widespread use of penicillin in the treatment of gonorrhea has raised several problems with respect to the effect of such therapy on concomitantly acquired syphilis. Since the doses of penicillin usually employed (100,000 to 200,000 units) are sufficient to cause the disappearance of treponema pallidum from primary lesions which were previously dark-field positive, and since these doses are subcurative for established syphilis in man, it is conceivable that such therapy given during the incubation period of syphilis might (a) prolong the incubation period,

(b) suppress the symptoms and result in an asymptomatic infection, or (c) actually abort the syphilis. A number of cases have been reported in which penicillin therapy for gonorrhea has rendered the diagnosis of syphilis difficult, either by making a preexisting but unrecognized primary lesion darkfield negative, or by delaying the appearance of symptomatic or serologic evidence of the disease.

The authors demonstrated that, in rabbits, small doses of penicillin have definite suppressive effects on the development of the lesions of early syphilis. The smaller the spirochetal inoculum, the more pronounced is the suppressive action of penicillin, and the suppressive action is maximal when the penicillin is given before the seventh day of the illness. When penicillin fails to prevent the appearance of the primary lesion, it regularly causes a significant prolongation of the incubation period, probably because most of the organisms have been killed by the penicillin and the few residual organisms take more time to develop a primary lesion. In some cases, the primary lesion and the infection were aborted. In general, the smaller the inoculum and the earlier treatment was begun, the greater was the proportion of inoculated sites at which lesions failed to develop.

Clinically, doses of penicillin comparable to those used in the treatment of gonorrhea may materially modify the course of syphilis simultaneously acquired; in many of the cases the incubation period is merely prolonged and the patient may no longer be under medical supervision at the time of development of the lesion. Patients treated for gonorrhea with penicillin should be followed up both clinically and serologically for a minimum period of 4 months after exposure in order to minimize the possibility of delayed primary lesions or clinically "asymptomatic" syphilitic infections, and the patients should be specifically advised of this danger.

DAVID ROSENBLOOM, M.D.

Joshi, L. B.: Urinary Calculi. *Ind. J. Surg.*, 1945, 7: 69.

The author's article may be summarized as follows:

1. The uriniferous tubule probably acts on the principle of a flush.
2. All deposits in the kidney which are insoluble, pigments, and casts could be seeds of urinary stones.
3. Sodium, chlorides, and sulfates have the property of preventing the formation of urinary stones.
4. The tertiary rock map of the world in association with the big rivers resembles the map of distribution of urinary stones.
5. The scarcity or abundance of water has no effect on the incidence of urinary stones.
6. The temporary hardness of water is one of the most important causes of urinary stones.
7. The envelope shaped crystals seen in oxaluria are composed of potassium oxalate and not of calcium oxalate.
8. In cases of phosphaturia, gastric analysis often reveals achlorhydria or hypochlorhydria.
9. Calcium sulfate is a fairly common constituent of urinary stones.
10. The age incidence of urinary stones probably depends on the general standard of health and care of children.
11. Town people acquire more urinary stones (than the rural population) if the water is not chlorinated or filtered.
12. Whales, sailors of old days, and long term jail inmates have no urinary stones.

JOHN A. LOEF, M.D.

Wilson, J. G., Benjamin, J. A., and Leahy, A. D.: Study of Experimental Urinary Calculi; Methods for Producing and Preventing Calculous Formation in the Bladder and Urethra of Albino Rats. *J. Urol.*, Balt., 1945, 54: 503.

Newborn albino rats were injected thrice weekly with 0.1 mgm. of estradiol diproprionate for a period of from 2 to 4 weeks, so that the total dosage was either 0.6 or 1.2 mgm. Seventy-eight injected animals were fed on a commercially prepared stock ration which did not vary much from other such preparations, all of which are of a high mineral content. Thirty-four animals were fed on a low mineral diet which was of sufficient amount to be compatible with normal growth and reproduction. Beginning at 30 days of age, periodic examinations by palpation of the bladder and the urethra, and by x-ray, were made to detect the presence of stones. Urinary infection was ascertained by culture and by the ability of the organisms to split urea. The urine *p*H was determined on each specimen.

Forty-five animals were fed on a high mineral diet until the presence of stones was ascertained, death ensued, or until 15 months of age was reached. In this group there were 29 male animals, 24 (82.8%) of which developed vesical or urethral calculi between the first and the fifteenth months, and during this period none of the females or control animals developed stones.

In order to determine the accuracy of x-ray and palpation as a method of demonstrating urinary calculi, 23 male and 12 female animals were fed high mineral diets after weaning, and were sacrificed at intervals for autopsy. The results confirmed the opinion that the stones began to form sooner than they could be detected by means other than autopsy. The authors state that if all the males had been permitted to live to the age of 110 days, it may be estimated that at least 10 (47.6%) would have yielded stones at autopsy, as contrasted with 29.2 per cent of known cases of lithiasis at this age in the previous group of male animals. Also, 1 female in the autopsied series was found to have stones in the bladder. There was no difference in the incidence of stones in the group receiving 0.6 or 1.2 mgm. of estradiol dipropionate.

Cultures of bladder urine of injected males showed infection whether or not calculi had formed.

Specimens from 13 older males yielded escherichia coli in 10, and the remaining 3 showed a nonhemolytic streptococcus, alpha hemolytic streptococcus, and a mixed streptococcus fecalis and escherichia coli. No correlation existed between the infectious agent and the age at which the host formed calculi, and the urine of animals having calculi was always more or less alkaline. Urinary infection always preceded calculus formation.

Seventeen of the 24 males with infection showed focal sites of infection in the bulbourethral gland and occasionally in the prostate seminal vesicles or bladder wall, but rarely in the kidney. In the injected females, 9 of the 20 had infected bladder urine, but it is of particular interest that at necropsy not a single instance of focal infection was found in the urinary tract. Focal infections were observed in the atrophic uteri and oviducts in 8 of 28 cases, but were not always associated with infection in the urine.

All stone-bearing males revealed some urinary tract abnormality with a variable resultant stasis. The most persistent finding was obstruction between the bladder and urethral sinus which seemed occasioned by the common finding of an abscessed bulbourethral gland. Then too, the sectioned urethra at this point of several young estrogen-injected rats revealed great numbers of desquamated cornified cells, often in the form of large plaques suspended in the lumen. No urinary obstruction was found in the female animals, except in the one which developed a stone.

Nineteen males and 15 females were injected during the first 2 weeks of life. They were fed a low mineral diet and sacrificed after a period of 180 days. Two males in this group revealed calculi; the other animals were free of stones. The stone incidence in this group was reduced from 82.8 per cent to 10.5 per cent by feeding a group of injected animals on a low mineral diet.

The authors concluded, from their experimental work, that (1) infection preceded stone formation, (2) alkalinuria was characteristic of stone forming animals, (3) neither the type of organism nor its urea splitting potentialities was related to the urine *p*H or calculus formation, (4) urinary stasis accompanied calculus formation but was not necessarily responsible, and (5) lithiasis so produced could be materially reduced by a diminished mineral diet.

ROBERT LICH, JR., M.D.

Benjamin, J. A., Wilson, J. G., and Leahy, A. D.: Study of Experimental Urinary Calculi; Quantitative Microchemical, Spectrographic, and Citric Acid Analyses of Albino Rat Calculi, with a Preliminary Apatite Report. *J. Urol.*, Balt., 1945, 54: 516.

The stones analyzed in this paper were produced experimentally in rats by feeding them on a high mineral diet and subjecting them simultaneously to injections of estradiol dipropionate. The calculi varied in size from 1 to 6 mm.

Ninety per cent of the stones showed a composition of magnesium, ammonia, phosphate, and moisture. Calcium was found in small amounts, as was citrate and carbonate in only minute amounts. These results were confirmed by spectrographic analyses. It was found that carbonate-apatite was a common constituent of the stones studied.

The principal chemical constituents in this series of calculi were reasonably constant, irrespective of the size, shape, or site of origin. Bladder calculi as compared to urethral calculi were white in color rather than brown but in both, magnesium ammonium phosphate hexahydrate was the principal compound, though the urethral calculi contained calcium and more phosphate.

Spectrographic studies confirmed the findings, and occasionally revealed small amounts of sodium, iron, aluminum, and silicon. ROBERT LICH, JR., M.D.

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS

CONDITIONS OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC.

Jönsson, G.: Has Acute Hematogenous Osteomyelitis Become Less Common and Less Severe? *Acta chir. scand.*, 1945, 92: 533.

The author has gone through the material of 30 years (1912–1941) of hematogenous osteomyelitis seen at the Surgical Clinic in Lund. This followed a suggestion made during the last decade that acute hematogenous osteomyelitis has changed in character in that it has become less severe with the years and, at the same time, a disease that occurs less and less frequently.

The material consists of 135 cases. Its distribution regarding sex and age corresponds to the figures usually given. If the cases are divided into 5 year periods one finds that the smallest number has been treated during the last period, during which no death occurred. The study reveals that a smaller number of complications have occurred during the last 5 year period as compared with earlier ones. The duration of treatment has been considerably shorter during later years. During recent years the patient's condition on admittance to the clinic has been much better than formerly. In nearly all of the cases the treatment has been operative. Serum or chemotherapy has not been employed in any of the cases.

The Lund material gives one the very definite impression that the disease has had a considerably more benign course during later years than previously, with fewer deaths during the septic initial stage, fewer complications during the later stages, and a more rapid course of healing.

Buchman, J., and Blair, J. E.: Penicillin in the Treatment of Chronic Osteomyelitis. A Preliminary Report. *Arch. Surg.*, 1945, 51: 81.

The authors conducted a clinical and bacteriological study of the results of treatment of chronic osteomyelitis with penicillin, with and without surgical intervention. There were 68 lesions in 47 patients.

Some of the conclusions drawn are tentative because of an insufficient period of follow-up, but others are sufficiently clear and certain.

The use of penicillin alone, whether given by local application or intramuscular injection, is totally ineffective in chronic osteomyelitis. If after preoperative and postoperative administration of penicillin and thorough saucerization the resultant wound is allowed to heal by granulation, the results are not materially influenced by the addition of penicillin to the treatment. The same type of treatment and delayed primary closure (rather than allowing healing by granulation) constitute a considerable improvement over previous methods. The treatment of chronic osteomyelitis by preoperative and postoperative administration of penicillin, thorough saucerization of the focus of infection, and primary closure of the resultant wound gave extraordinarily good results in 23 of 27 patients, but the authors state that the postoperative period of observation was insufficient.

Of the tuberculous lesions of the bones and joints secondarily infected with coagulose positive staphylococcus aureus, treated by the preoperative and postoperative administration of penicillin, and subjected to thorough saucerization and primary closure, a limited number presented primary healing over a short period of observation.

A distinct advantage of primary closure is the reduction in the incidence of secondary infection which so frequently (80%) complicates delayed closure. Staphylococci persisting in wounds healing by granulation or delayed closure develop increasing resistance to penicillin.

DANIEL H. LEVINTHAL, M.D.

Altemeier, W. A., and Reineke, H. G.: Roentgenographic Interpretation of Acute Hematogenous Osteomyelitis Treated with Penicillin. *Am. J. Roentg.*, 1945, 54: 437.

The introduction of penicillin has completely altered the management of acute hematogenous osteomyelitis. The rapid control of the general and local infection makes an emergency surgical decompression of the area of the bone involved unnecessary except in the fulminating cases. Operative intervention, as a rule, is limited to incisions and drainage of abscesses of the soft tissues, and to removal of sequestra. Because of this milder course the bone changes which follow show a different appearance from that which is known to characterize the subsequent stage of acute hematogenous osteomyelitis and therefore roentgen interpretation merits our attention.

During the past 27 months the authors observed 52 cases of acute hematogenous osteomyelitis treated with penicillin. In 44 of these the osteomyelitis was localized to the long bones, in 4 to the flat pelvic bones, and in the remainder to both. The etiological agent was represented by the hemolytic staphylococcus aureus in 42 cases, the nonhemolytic staphylococcus albus in 3, the hemolytic streptococcus in 1 case, the pneumococcus III in 1, and it remained undetermined in 4 cases.

All of the cases were treated with penicillin, although in 28 limited amounts of sulfonamides were given prior to the penicillin. The early cases received less than 800,000 units of penicillin, but eventually a total of 1,500,000 units given intravenously or intramuscularly at the rate of from 15,000 to 25,000 units every 3 hours proved the most desirable dosage. In some cases it was administered by intravenous drip at the rate of from

25 to 30 drops per minute in the form of 2,000 c.c. of physiological saline solution containing 30,000 to 80,000 units of penicillin. The dose was reduced when it became apparent that the infection was controlled.

The results were remarkable. All patients recovered except 1, so that the mortality was only 1.9 per cent. The period of morbidity likewise was strikingly reduced.

Clinically, the cases were divided into four groups:

Group 1. The correct diagnosis was made within the first 2 or 3 days and adequate treatment started immediately. The results were truly excellent.

Group 2. The diagnosis and treatment were moderately delayed. Here, the infection was brought under control in 2, 3, or more days, and local soft tissue abscesses developed more frequently.

Group 3. The diagnosis and treatment were delayed for from 7 to 10, or more days, when the infection was unusually severe, local destruction of bone became very great, and soft tissue abscess formation and sequestration occurred in most cases. In this group the infection was arrested with more difficulty and rather prolonged treatments were necessary. Small abscesses were treated by aspiration, large ones by incision and drainage, and the sequestra were removed.

Group 4. The osteomyelitis was so fulminating that surgical intervention still constituted an emergency measure. In such instances, penicillin, at the rate of 15,000 units every 1 to 3 hours, was given preoperatively and postoperatively.

The roentgen changes in the various groups were interpreted as follows:

In group 1 the bone alterations were minimal, consisting of areas of localized periosteal reaction, small areas of patchy decalcification of the underlying cortex, little or no evidence of sequestration, and ultimate reconstitution of the bone. In 3 cases the roentgen findings were entirely negative.

In group 2 the changes, likewise, were minimal at the beginning of the treatment, but after a week or so periosteal reaction and patchy demineralization of the underlying cortex became evident. These increased in extent and degree, becoming most marked in from 1 to 5 months after the onset of the infection. Then, recalcification followed with rapid return to normal. Sequestration occurred only occasionally. In group 3 there was extensive bone destruction at the start of the penicillin therapy. This increased on subsequent examinations. Small sequestra were absorbed spontaneously and larger ones acted as autogenous grafts. Rarely was the sequestrum discharged. Recovery followed eventually.

In group 4 the bone destruction was very extensive due to the severity of the infection.

The authors include detailed clinical histories of 6 typical cases and use serial roentgenograms to illustrate the course of the disease under the influence of the penicillin therapy and the good results obtained. T. LEUCUTIA, M.D.

Lewis, R. W.: Differential Diagnosis of Tuberculosis in Joints of the Extremities. *Am. J. Roentg.*, 1945, 54: 329.

In 1924 Phemister described the principal criteria of differential diagnosis between tuberculous and nontuberculous suppurative arthritis. These criteria still stand although they are not as widely employed as their importance warrants. Therefore, the author wishes to restate them and add some new ones of his own.

According to Phemister, in pyogenic arthritis there is early narrowing or disappearance of the joint space, because of the fact that the articular cartilage is killed and broken down, first at the points of contact and pressure of the opposing articular surfaces. For the same reason, the earliest bone destruction occurs in the opposing, or weight bearing, portions of the articular surfaces. In contrast to this, in tuberculous arthritis the joint space is preserved for months or years, since the earliest destruction is peripheral, along the surfaces where tuberculous granulations can grow. Likewise, the earliest bone destruction is not on the contiguous opposing bony surfaces, but about the margin of the weight bearing surfaces.

To these points the author adds: (1) in acute pyogenic arthritis osteoporosis about the joint is rapid and marked, whereas in tuberculosis it is usually lacking; (2) acute pyogenic joints show a distinct tendency toward repair and ankylosis, features which are customarily absent in tuberculosis; and (3) in tuberculosis the adjacent muscles often are markedly atrophic, which is not the case in acute pyogenic infections.

Unfortunately, however, the picture is not always so clear. There are many variables due to difference in virulence of the invading organisms and reaction in the host. Another confusing factor is the apparent difference in the roentgen manifestations of certain joints, as for example the hip joint, in which the criteria of Phemister are seldom observed, and therefore the differential diagnosis must be more circumspect. Still another difficulty is created by the rather infrequent but entirely different form of tuberculosis, the so-called caries sicca.

The differential diagnosis of tuberculosis of joints from other diseases than acute pyogenic infection, as a rule, is quite easy, although lymphatic leucemia, and probably some other conditions, may simulate tuberculous arthritis.

Several illustrative cases are presented to prove the various points. T. LEUCUTIA, M.D.

Simon, H. E.: Muscle Hernia, with Report of 6 Additional Cases in the Arm and Leg. *Mil. Surgeon*, 1945, 97: 369.

Muscle hernia, or protrusion of muscle tissue through a defect in the overlying fascia, is rarely recognized in civilian life. In military service, it is frequently observed and often symptomatic. The author presents 6 case reports to add to the 163 cases of muscle hernia described in the literature.

Three of the patients developed the hernias in the lower extremities and 3 in the upper. The condition occurs almost invariably in the third and fourth decades and is practically limited to males.

Three types are recognized:

The congenital type. No case has been found in the literature which was primarily of congenital origin.

The traumatic type. (a) Direct trauma as laceration, contusion, or puncture wound; (b) indirect; due to a single powerful muscle action.

The idiopathic or spontaneous type. Due to increase in muscular development and activity.

The anterior tibial muscle is the one usually involved, although hernia may appear anywhere. It appears as a circumscribed semifluctuant swelling which varies in size according to the position of the part involved and the state of contraction of the underlying muscle. Typically the swelling increases in size with muscle relaxation and is reduced by pressure, which reveals a circumscribed defect palpable in the fascia. Aching pain or local tenderness may be present as well as muscle cramping and increased fatigability.

Hernias due to direct trauma appear immediately or several months after the resumption of muscle activity. They may reach a diameter of 6 cm. or more. Pain and discomfort are more pronounced.

Those due to indirect trauma appear abruptly after the accident.

The idiopathic type is usually small and not infrequently multiple and bilateral, and occurs almost exclusively in the legs. It may be mistaken for localized varicosities, arteriovenous aneurysms, lipomas, myomas, or cysts.

Treatment is indicated when the defects are large and deforming, or produce symptoms that are interfering with normal activities.

Temporary symptomatic relief may be attained by elastic pressure bandages. For permanent cure surgery is usually necessary. This consists of careful exposure of the fascia defect and closure by overlapping and suture of the fascial edges.

When the defect is large, a fascial transplant may be used either as a patch or an interlacing strip—the patch is preferable. Pressure immobilization with elastic bandages or cast is maintained for 3 weeks postoperatively, after which activity is gradually resumed.

VERNON C. TURNER, M.D.

Wyatt, H., McWhirter, R., and Johnson, H.: A Symposium on Ankylosing Spondylitis. *Brit. J. Radiol.*, 1945, 18: 306.

In this symposium, Wyatt of the Ministry of Pensions gives an account of the results of the treatment of pensioners suffering from ankylosing spondylitis by deep x-ray therapy and massage. After the last war the disease was observed rarely but in this war it has become much more common. The author supervised the treatment of about 100 cases.

The present scheme is to arrange x-ray treatment on 5 consecutive days in a week, the first course generally lasting 3 weeks. This results in much relief of pain although stiffness persists. The treatment is repeated at intervals of from 2 to 3 months. In the interim suitable exercises are given in a Ministry Clinic, sometimes preceded by some form of heat, such as radiant heat or diathermy. The exercises are given by masseuses. In the main, the idea is relaxation of spasm and posture and increased mobility of the spine and thorax. Breathing exercises are important and are done in various positions.

After all treatment is completed the men are encouraged to return to work. Following supervision of the treatment for about 1 year, the author rarely hears from such men, unless it is to report that they are proceeding satisfactorily.

McWhirter of the Edinburgh Royal Infirmary gives a clinical discussion of the subject. To avoid confusion he assumes that ankylosing spondylitis is synonymous with the Marie-Struempel type of spondylitis ankylopoietica.

It is important that the disease be recognized early since, unfortunately, little or nothing can be done in the advanced stages.

The author's experience covers 168 cases, of which no less than 91 per cent were in males. As a rule, the onset of the condition occurred during the third decade of life.

The earliest symptoms are fleeting pains in the back and hips, followed by more constant pains localized in the lumbar region. Then the back becomes stiff and there is some deterioration of the patient's general health. Chest expansion becomes restricted and the sedimentation rate is raised. X-ray examination shows blurring and irregular destruction of the sacroiliac joints, with sclerosis of the bone adjacent to the joints. The spine at this stage shows little or no change.

As the disease progresses the posterior articulations of the spine become narrowed and the margins of the vertebral bodies become sharp. Still later, the anterior and lateral common ligaments become ossified and eventually the entire spine assumes a "bamboo appearance." Less well recognized changes are irregularities of the ischial tuberosities, ilium, symphysis pubis, and of the sternum. Some of the joints of the extremities may also become involved.

The etiology remains unknown.

The treatment consists of a combination of deep x-ray therapy and various orthopedic measures. The x-ray therapy is localized to the sacroiliac joints and the whole length of the spine. The factors are: 250 kv., 1 mm. of steel, and 2,500 roentgens of skin dose on all fields given over a period of two weeks. This produces a reaction not exceeding dry desquamation.

According to the x-ray findings, patients are classified into (a) early, (b) moderately advanced, and (c) advanced cases. Patients in the first two classes are put to bed with fracture boards under the mattress for several weeks. Deep breathing exercises are started first, then other exercises are carried out with the patient on his face until the lumbar

stiffness is overcome. After the patients are up, a light brace is fitted in group *a* and a light plaster jacket in group *b*, which may be worn from 6 to 12 months, or longer.

The results are encouraging. In group *a* the patients have remained well for as long as 7 years. In group *b* relief of pain and general improvement are often obtained for varying periods. Even in group *c* some relief of pain and, unless the spine is completely ankylosed, a partial correction of the deformity is possible.

Johnson of the Charterhouse Rheumatism Clinic, in his part of the symposium, pays special attention to the prognosis of spondylitis in relation to treatment. He takes exception to the very gloomy view as expressed in Volume 2 of the British Encyclopedia of Medical Practice (1936). The books of the Charterhouse Rheumatism Clinic contain reference to some 500 spondylitis patients. A review of these records reveals an entirely different aspect.

The disease is almost certainly an infection, possibly due to a form of tubercle, although some regard it as a disease of the endocrine system. In many instances breakdown of the natural resistance seems to be determined by physical overstrain or by an accident. In the untreated case, the prognosis depends on this breaking down of the natural resistance.

Some years before his death, Scott introduced the "wide field" method at this institution for the x-ray treatment of ankylosing spondylitis. The principle behind this method was to stimulate the natural resistance. The results were so satisfactory that the method is being continued. An average dose of 50 roentgens twice a week is given, but in some cases it is reduced to 10 roentgens to avoid all possible unpleasant reaction. Hemoglobin estimation and special sedimentation tests are often necessary guides. The total dosage in 1 year is not allowed to exceed 1,500 roentgens.

If x-ray treatment cannot be given, stock vaccines of streptococci and staphylococci given weekly are often a good substitute. Other forms of stimulus, such as cold or even ultraviolet ray baths, may be of value. Potential foci of infection should be removed.

Under such care the prognosis as regards the continued capacity to earn a living is good. Nearly all patients of the Clinic are able to hold down ordinary jobs. Neither are they dissuaded from marriage. There is no proof that the disease is hereditary.

T. LEUCUTIA, M.D.

Hooker, D. H.: Brachymetopody. *Bull. Johns Hopkins Hosp.*, 1945, 77: 329.

Brachymetopody is a condition in which certain digits of the hand or foot are shorter than normal. It is caused by abnormally short metacarpals or metatarsals, respectively. Three cases are presented in which there were short fourth toes.

The chief complaints were metatarsalgia, callosities over the metatarsal heads, and relaxed longitudinal arches. The condition apparently was present at birth. All of these patients began having trouble with their feet after basic training in the Army.

Fig. 1. Shortening of otherwise normal fourth metatarsal bones, each metatarsal being about 1.5 cm. shorter than the adjacent third metatarsal.

A hereditary factor was established in every one of these cases. The treatment consisted of arch supports, metatarsal pads, weight reduction, and limited physical activity.

A congenital origin of brachymetopody is suggested by the author. GEORGE I. REISS, M.D.

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC.

Knight, M. P., and Wood, G. O.: Surgical Obliteration of Bone Cavities following Traumatic Osteomyelitis. *J. Bone Surg.*, 1945, 27: 547.

High velocity war missiles have not only contributed many cases of osteomyelitis of the long bones, but have furnished the orthopedic surgeon with many massive soft tissue and bone defects. Since skin and muscle defects over the long bones unequivocally interfere with bony repair, the authors have devised a new approach for the expeditious obliteration of such cavities. It is apparent that if let alone, these defects would prolong rehabilitation and increase morbidity. To expect bone growth to ensue in the presence of infection, granulation, or even scar tissue, is indeed a bizarre expectation. Furthermore, bone does not show any demonstrable evidence of regeneration beneath adherent split thickness grafts as the cavities remain essentially the same size for an indefinite period of time. Previous efforts to obliterate septic cavities by antiseptic paste, fat, muscles, and pedicle grafts have also proved unsuccessful.

The authors present a small series of 23 cases which were operated upon in three stages; (1) thorough sequestrectomy and excision of scar, (2) early split skin grafting, and (3) bone grafting followed by immediate application of a full thickness pedicled graft.

The first stage is that of sequestrectomy and preparation of the cavity. All cicatricial soft tissue must be excised. Eburnated bone or cartilage, if the defect is near a joint, must be saucerized in its entirety. The wound is then packed with vaseline gauze and the limb is encased in a cast. At the end of 5 days, the wound is inspected and if an exuberant granulation is noted on the bony cavity, a split grafting operation is done to convert the compound wound into a closed one.

The second stage comprises the application of a split thickness skin graft. The recipient area is curetted of any nonviable or granulation tissue, and a split thickness graft from .010 to .016 of an inch is obtained and placed over the defect. A pressure dressing (Koch's) is applied on the wound. Immobilization is effected by a splint or cast. Chemotherapy consisting of penicillin or sulfonamides is administered for 3 days. Under this regime from 80 to 95 per cent skin "take" has been observed.

The third stage consists of obliteration of the bone cavity with autogenous bone chips. The principal factors of this stage are:

1. Planning of a suitable full thickness covering for the defect
2. Complete excision of the split thickness covering from the depth of the saucerized bone defect
3. Procurement of sufficient bone chips from the iliac crest or other suitable sites to fill the cavity completely
4. Covering of the chip filled cavity with skin and subcutaneous tissue without skin tension and placing the suture line on sound bone.

Osteogenic consolidation of the defect can be further enhanced by curetting the cavity and opening both ends of the medullary canals. A pressure dressing of machinist's waste is again applied, sutures are removed in 6 days, chemotherapy is continued for from 3 to 5 days, and immobilization is maintained until bony union is obtained.

Accompanying the article are many excellent photographs of the technique and numerous roentgenograms of the bony defects involving the tibias and femurs.

The complications encountered in the 23 cases were: hematoma in 2 tibias, suppuration in 1 tibia, and a draining sinus adjacent to the operative site in a femur. SAMUEL L. GOVERNALE, M.D.

Gillis, L.: Nearthrosis of Humerus Shaft for Amputation at the Elbow. *Brit. M. J.*, 1945, 2: 686.

The author describes a new operation for making a joint in the shaft of the humerus for cases of amputation at or near the elbow joint. According to this article it is no longer necessary to amputate an arm at the orthodox site of election, i.e., 7 or 8 inches below the tip of the acromium. It is to be remembered that the forearm resected at, above, or below the elbow joint can now be fitted with a useful prosthesis.

As its purpose, the operation is designed to accomplish two distinct functions: (1) to conserve the muscular power of the flexors and extensors of the forearm, and to harness that function; and (2) to make a new joint in the shaft of the humerus at least 4 in. below the shoulder which should possess the property of complete extension and a varying degree of flexion.

The author has performed 24 such operations. The first 8 of these necessitated a second intervention for removal of increasing ankylotic bone callus in order that bony union of the new joint be prevented. The technique was altered as follows:

1. A posterior muscle splitting incision from 2 to 3½ inches long was used.
2. From 1½ to 2 inches of the humeral shaft were removed with a gigli saw.
3. The ends of the bones were bevelled at an angle of 45 degrees in front, to permit the maximum degree of flexion.
4. The medullary cavity of the bones was curetted and packed with bone wax.
5. The bone ends were fulgurated and sulfanilamide implanted in them. This step is considered important by the author as it vitiates osteogenesis.

The postoperative management consists of the application of a straight plaster of Paris cast for 3 weeks, active and passive motion of the "new forearm," and the application of a figure "8" crepe bandage.

In addition to several illustrations, the article contains 5 detailed case reports depicting the technical perplexities encountered in the original operations and their solutions.

The results in 10 cases show uniform function of flexion and ability of the patient to touch his face and back of the neck without pain. Six of the 24 patients have acquired varying degrees of active flexion and the condition is still improving. Functional results in the first 8 cases (operated twice) were not noted. SAMUEL L. GOVERNALE, M.D.

FRACTURES AND DISLOCATIONS

Ellis, J. S.: Wounds in the Region of the Hip Joint. *Lancet*, Lond., 1945, 249: 490.

The unsatisfactory results in a group of 44 wounds of the hip-joint and high femoral fractures treated in the base hospital attended by the author, prompted a review of the methods used and led to the suggestion of improvements.

In 1914 to 1918, the mortality in this group was 60 per cent, accounted for largely by visceral injuries, and a stiff hip with shortening and often persistent draining sinuses was accepted as the usual result. Recent Russian writing advocates radical surgery with early resection of the joint or disarticulation at the hip, to control toxemia.

The patients were received from 1 to 4 weeks after injury, and had either obvious wounds of the hip joint or fractures in the area of the neck or trochanter with doubtful penetration of the hip joint. Twenty-two patients had been or still were toxemic

when received. All had been explored and foreign fragments had been removed, including many bone fragments. Plaster spicas or Thomas splints were used for transportation, and usually changed en route at the receiving hospital where some wounds were re-explored. Systemic administration of sulfonamides and penicillin was done routinely. The base hospital employed skeletal traction in Thomas splints and plaster fixation about equally. Sequestrectomies and 5 major drainage operations of the Girdlestone type were done.

Ankylosis of the hip occurred in 13 of the 16 cases in which the hip joint became septic. In 16 patients the wounds were unhealed at 6 months. Six patients had 1 inch or more of shortening.

Slow healing is due to inadequate primary drainage which makes delayed primary suture impossible and, later, to failure to recognize early the need for sequestrectomy or drainage of hidden abscesses. The use of penicillin masks the presence of undrained pockets, and this must be remembered in appraising the situation.

The shattered femoral head must be removed early to facilitate healing.

Shortening is inevitable in head and neck fractures, but traction rather than plaster immobilization overcomes the tendency toward bowing and shortening in trochanteric fractures. Early knee motion is of great importance and need be delayed only when the desire to encourage hip fusion requires plaster immobilization rather than traction in a Thomas splint.

No life or limb was lost in this series, but, in retrospect, morbidity might have been reduced by the knowledge gained and summarized here. Roentgenography before primary treatment is desirable to determine the status of the fracture, especially as to whether the femoral head is involved. Bone fragments should not be removed freely unless they are all or part of the femoral head. Rectal examination is essential to help establish the extent of possible intrapelvic injuries. A minimum of skin should be excised—no skin should be sutured—and a plaster spica should be used for transport. Systemic chemotherapy, of course, is used early, and a "booster" dose should be given again before each change of cast or other manipulation to inhibit flare-up of the infection.

Adequate later treatment necessitates removal of the cast and careful estimation of the patient's general condition with reapplication of the plaster spica only when ankylosis of the hip is desired. Constant vigilance for abscess formation or the presence of foreign bodies or sequestra, with prompt surgery will prevent persistent sinus drainage and lessen the morbidity. Early appreciation of the cases requiring radical treatment for deep seated infection, and prompt surgery of the Girdlestone type will save life and reduce morbidity. In the author's experience the end result of this treatment has been satisfactory.

FRANCES E. BRENNECKE, M.D.

Godoy-Moreira, F. E.: Difficult Fractures of the Neck of the Femur Treated with the Stud-Bolt Screw. Simplification of Technique. *J. Bone Surg.*, 1945, 27: 595.

In July, 1940 the writer reported a technique for treating ununited fractures or otherwise difficult cases of fracture of the neck of the femur with the stud-bolt screw. Since then the technique has been simplified. A hand drill has been substituted for the motor drill and the hard cortex is perforated by a hand driven burr, preliminary to the insertion of the stud-bolt screw.

Eighty patients have been treated by this technique with excellent results and 8 case reports are presented, illustrating that good union and function may be obtained. One patient, a 65 year old female, was operated on 2 days following fracture of the femur. Four months later she had perfect union with normal function. The remaining 7 patients sustained fractures from 3 to 18 months before operation, the youngest being 40 and the oldest 70 years old. Of the 7, 6 obtained good union and perfect function, while in 1, a 70 year old male, nonunion persisted but the patient was able to walk 2 miles easily. This good result is attributed to achieving solid osteosynthesis by means of the screw. In 2 instances osteotomy was performed at the same operation as an aid to union.

A short plaster spica is applied to the knee 20 days after operation and the patient is permitted to walk; the spica is removed 40 days afterward.

RUDOLPH S. REICH, M.D.

ORTHOPEDICS IN GENERAL

Howard, J. E., Parson, W., and Bigham, R. S., Jr.: Studies on Patients Convalescent from Fracture. The Urinary Excretion of Calcium and Phosphorus. *Bull. Johns Hopkins Hosp.*, 1945, 77: 291.

The calcium and phosphorus metabolism, with special reference to Ca-P concentration in the urine, was studied in a group of 17 patients. Thirteen patients were convalescing from femoral and tibial fractures, and 4 were studied before and after femoral osteotomy for slipped epiphysis.

This study was made in an attempt to explain two frequently observed conditions in recumbent orthopedic patients: (1) nephrolithiasis and (2) a lack of lime salts in the bones of limbs immobilized for long periods of time.

A steady rise in the calcium output in the urine was noted. It reached its maximum approximately 1 month after injury. The peak of excretion of calcium was maintained for an indefinite period. It usually began to fall when the immobilization was discontinued.

A similar pattern of urinary calcium excretion was observed in patients who had had a femoral osteotomy. The peak of calcium excretion, however, was reached much earlier. In patients who had suffered a fracture, a rapid breakdown of protein occurred

with the excretion of large amounts of nitrogen. The maximum amount of urinary excretion of nitrogen was reached in from 5 to 7 days. It subsided in from 25 to 40 days.

Maximal excretion of calcium in the urine occurred in every instance at a time when the urinary output of nitrogen had returned to normal. The same reciprocal relationship between maximal diuresis of calcium and nitrogen had been observed in patients subjected to femoral osteotomy.

The type of injury (simple or compound fracture), and the patient's age, height, and weight or bony structure (heavy or light bony frame) had no bearing of the urinary output of calcium. The increase or decrease of water intake had no influence on the amount of calcium output in the urine. Alkalinization, sulfadiazine, or sulfathiazole did not change the level of the calcium excretion.

Large shifts in dietary calcium affected the urinary output of calcium very little. An increased or diminished intake of calcium in the form of calcium lactate had a somewhat greater influence upon the calcium diuresis than the intake of calcium in the form of milk.

Vitamin D_2 (calciferol) in varied doses, with or without an increased intake of calcium, did not significantly change the calcium excretion in the urine.

The rise and fall of intake of inorganic phosphorus showed similar changes in the urinary output of phosphorus.

The blood constituents of the patients showed no significant changes in the hemoglobin, red blood count, blood volume, calcium and phosphorus levels, and alkaline phosphatase concentration.

The theory that a decreased blood supply causes increased bone density, and that hyperemia of the part results in skeletal rarefaction is challenged by the fact that reduction of the blood supply causes atrophy of the issue supplied. Unilateral lumbar sympathectomy in children caused the leg on the same side to improve its growth in most instances. This influence on the growth of the leg is exercised by the control of its blood supply. There is experimental evidence that venous obstruction accelerated fracture healing by speeding the formation of callus.

GEORGE I. REISS, M.D.

Balboni, V. G., Shapiro, I. M., and Kydd, D. M.: The Penetration of Penicillin into Joint Fluid following Intramuscular Administration. *Am. J. M. Sc.*, 1945, 210: 588.

Seven patients with hydrarthrosis affecting one or more joints were studied; 5 had typical rheumatoid arthritis and 2 an atypical disease which was probably also rheumatoid arthritis. In only 1 case was the joint severely inflamed. Four of these patients received 25,000 units of penicillin in 2.5 ml. of normal saline solution administered intramuscularly every 3 hours and 3 received 40,000 units. In each instance samples of serum and joint fluid were obtained simultaneously ½, 1, 2, and 3 hours after the patient had received the eighth dose of penicillin. In 4 instances, however, the samples were obtained 3 hours after the sixteenth dose, and in 1 instance, material was obtained 3 hours after the twenty-fourth dose. The concentrations of penicillin in both the blood sera and the joint fluids from these patients were determined by the cup assay method as modified by Cholden (*J. Bact.*, Balt., 1944, 47: 402.).

In all cases penicillin was found to penetrate readily into the joint which resulted in that essentially equal amounts of the penicillin entered the joint fluid and blood serum 1 hour after its administration. In the case of the serum concentrations, it is true, they fell rapidly after 1 hour and at the end of 3 hours little or no penicillin was detectable in this body fluid; however, in the joint fluids the concentration of penicillin descreased more slowly, there being appreciable amounts of penicillin present 3 hours after its administration.

According to Rammelkamp and Keefer the effective concentration of penicillin in the blood is 0.3 Florey unit per milliliter, and in the serum, 0.156 Florey unit. The joint fluid of the cases studied 1 hour after the administration of penicillin showed amounts of penicillin varying from 0.15 to 0.24 unit per milliliter, and the determinations made 3 hours after administration in 6 of the 7 patients showed that it still contained from 0.05 to 0.17.

The authors conclude, therefore, that the amounts of penicillin which are antibacterial for the common pathogens invading joints are obtained in the synovial fluid by the intramuscular administration of penicillin in the doses discussed.

Penicillin did not tend to accumulate in the joint fluid.

JOHN W. BRENNAN, M.D.

Bevans, M.: Changes in the Musculature of the Gastrointestinal Tract and in the Myocardium in Progressive Muscular Dystrophy. *Arch. Path.*, Chic., 1945, 40: 225.

In this article 4 cases of progressive muscular dystrophy are reviewed, with special reference to lesions in the myocardium and in the smooth muscles of the gastrointestinal tract. Progressive muscular dystrophy has been regarded as an intrinsic disease of the muscles. More recently the disease has been classified as a disorder of the autonomic nervous system.

In the past many workers have found diffuse scarring and deposits of fat in the myocardium of patients afflicted with progressive muscular dystrophy. Many others denied having found any pathological changes in the myocardium or gastrointestinal tract in these cases. Other investigators described a cardiointestinal syndrome in patients with progressive muscular dystrophy which was accompanied by vomiting, generalized abdominal tenderness and pain, diarrhea, tachycardia, and signs of cardiac failure. One author found roentgenological changes in the esophagus similar to those described in scleroderma.

A detailed account of the history, physical findings, the course in the hospital, laboratory data, and autopsy findings is given of the 4 patients with progressive muscular dystrophy. All of them died of pulmonary complications. The disease was usually discovered at the age of 4. It terminated with the death of the patient from 10 to 16 years later. The treatment of most of these patients consisted of the administration of acetylcholine, aminoacetic acid, vitamins B and C, and other purely supportive symptomatic measures.

All of these patients showed considerable wasting of all of the skeletal muscles on admission to the hospital. No muscular fibrillation was observed. Contracture of the muscles, especially of the plantar aponeurosis, gastrocnemius, and hamstrings, was seen which placed the lower extremities in a froglike position. Abnormally increased mobility of the shoulder, hip, and small joints of the hands was found. In most cases reflexes were absent. The electrocardiogram showed a right axis deviation and tachycardia in a few of the patients. The roentgenograms revealed moderate decalcification and considerable underdevelopment of the bones. In some instances the esophagus was slightly displaced by a dilated right auricle.

The laboratory data were normal except for a somewhat lowered basal metabolic rate in some cases.

On the autopsy table the muscles were found to be pale, thin, and streaked with yellowish fat tissue. In most cases the gastrocnemius, recti, pectoral, iliopsoas, and intercostal muscles were most seriously affected in the order mentioned. The heart was found to be hypertrophied and the endocardium was thickened and streaked with fibrous bands. Some sections of the myocardium and papillary muscles were found to be completely replaced by scar tissue.

Microscopic examination of the skeletal muscles showed changes usually found in progressive muscular dystrophy. Large channel-like structures showing disintegrated muscle fibers in their lumens and capillaries in their walls were very significant. Such structures probably represent the persisting perimysium after the muscle fibers have disintegrated. Other findings were great variation of the size and shape of the fibers, vacuolation and clumping of the sarcoplasm, and proliferation of the nuclei of the sarcolemma.

Sections of the myocardium and papillary muscles showed hyalinization, fibrosis, interstitial hemorrhages surrounded by mononuclear cells with phagocytosed red blood cells. The lower part of the esophagus showed considerable edema of the lamina propria, and the epithelium was irregularly desquamated. The small intestine showed similar changes in the muscular layers. In spite of the edema, the width of the walls was greatly reduced and the muscular layers were atrophied. The rectal mucosa exhibited infiltration of red blood cells and areas of autolyzed mucosa. The muscularis mucosa layers were fragmented. The longitudinal and circular layers were atrophied and the muscular fibers widely separated.

No lesions of the smooth muscles of the vascular system or of any other organs were noted. With the exception of the presence of thymic tissue in 1 case, no abnormalities of the endocrine glands were observed. GEORGE I. REISS, M.D.

SURGERY OF THE BLOOD AND LYMPH SYSTEMS

BLOOD VESSELS

Gurdjian, E. S., and Walker, L. W.: Traumatic Vasospastic Disease. *J. Am. M. Ass.*, 1945, 129: 668.

It has been known for some time that workers exposed to repeated percussion may develop circulatory disturbances in the hands. The condition is most frequently associated with the use of the pneumatic hammer, or jack hammer. Pneumatic hammer disease has become synonymous with white fingers, dead fingers, traumatic vasospastic syndrome, vasospastic disease of the hands, and Raynaud's disease.

The first report on pneumatic hammer disease was made by Loriga of Rome in 1911, while the first report on this condition in this country was made by Cottingham in 1917. Hamilton described the clinical findings in detail in 1918 after studying the problem arising out of a dispute between Indiana limestone cutters and their employers over the use of the pneumatic chisel.

The clinical pattern of traumatic vasospastic disease of the hands is almost stereotyped. After a few months to several years of exposure to the vibrations, the patient notices attacks of blanching and numbness of the fingers. The pallor is much more pronounced than in Raynaud's syncope, but it is not succeeded by the stage of extreme asphyxia so characteristic of the latter. It is not symmetrical even when in both hands.

The attacks may occur while the patient is working. Usually the blanching is most pronounced early in the morning, particularly in cold weather. The attacks can be brought on by washing the hands in cold water or by going outdoors for a while in cold weather. They usually come on more frequently in the winter months, when exposure to cold is more apt to occur. Emotion does not appear to produce the attacks. The attacks do not result in wasting and death of the tissue. The workers are also subject to Raynaud's and Buerger's diseases and hemiparesthesias not caused by the vibrations.

The present study is concerned with the clinical findings and the microscopic findings in the capillaries and arterioles of the fingers in 6 women war workers using a pneumatic riveter in airplane construction work in Detroit. The authors do not state the percentage of women affected in this occupational classification but to their knowledge this condition has not been described in women previously. Microscopic studies of the finger tips have not previously been reported. Serial sections of biopsies of the finger tips of 5 of the 6 patients showed no pathological changes except in two sections, revealing a red staining amorphous substance in the capillary.

The mechanism of the disorder is as yet unexplained. The possibilities mentioned are low temperature of the surrounding air at the place of work, anemia of the hand from holding the air hammer too tightly, and injury to the myoneural junctions of the arterioles in the fingers.

The clinical course of these patients has been characterized by attacks of benign vasospasm with little increase in severity over a period of 2½ years of study. The discontinuance of the use of the pneumatic hammer has not resulted in a single case of relief.

In the discussion de Takats stated that he believed that tools having a high vibration rate may produce a percussion neuritis. He mentioned Denny-Brown's experiments with a single percussion of a nerve trunk which indicate that the damaged myelin escapes from its sheath into the endoneural space and sets up an irritative internal disorganization of a mixed nerve which results in causalgia with its inco-ordination of circulation.

JOHN E. KIRKPATRICK, M.D.

Elkin, D. C., and Kelly, R. P.: Arteriovenous Aneurysm. *Ann. Surg.*, 1945, 122: 529.

A near disaster from hemorrhage from the posterior tibial vessels in the course of the excision of an arteriovenous aneurysm prompted the authors to modify their approach to these vessels and remove the upper portion of the fibula, with resection of the head of that bone when it became necessary. The collateral anastomosis which develops as the result of arteriovenous communication, together with dilatation of the vessels, including those which perforate the interosseous membrane, demands direct visualization of these vessels and their careful ligation and division. Otherwise the retraction of vascular channels through the interosseous membrane may result in serious or even uncontrollable hemorrhage and necessitate a second incision along the front of the leg, or the removal of the fibula in the presence of hemorrhage and at an inopportune time during the course of the operation. While this operation has been performed primarily as an approach to arteriovenous fistulas and aneurysms of the posterior tibial vessels, it is of equal importance to realize that the same approach is necessary to reach the anterior tibial and peroneal vessels in the upper part of their course. The authors prefer continuous spinal anesthesia for the procedure.

The operation is described in detail with illustrations of the technique. There are 15 case reports given with the preoperative findings. It is interesting to note that enlargement of the heart is not present in all cases, but it is found in some of them and seems to depend upon the length of time from the injury to the examination made before surgery.

The authors' conclusions are as follows:

Careful exposure of the tibial and peroneal vessels in the upper part of their course is necessary in the

operative treatment of arteriovenous fistulas in this region. This is facilitated by subperiosteal resection of the fibula, including the head of the bone if necessary. The resected portion of bone is not replaced. There has been no instability of the knee joint following this operation. Fifteen consecutive cases in which this procedure was carried out are presented in abstract. PAUL MERRELL, M.D.

Smith, S.: Studies in Experimental Vascular Surgery. *Surgery*, 1945, 18: 627.

As a preface to this experimental study a brief résumé of the representative techniques of blood vessel anastomosis is presented, and the merits of each technique are considered in an attempt to evaluate common factors essential to success, as well as the causes and mechanism of failure. Factors under experimental consideration are: (1) infection, (2) minimal size of vessel commensurate with average success, (3) coats of the vessel included in the stitch, (4) optimum spacing of the stitch, (5) optimum type of stitch, (6) factors involved in intravascular thrombosis, (7) types of suture material, and (8) anticoagulants.

Infection. It was impossible to evaluate the significance of infection as a cause of failure. In some cases in which infection occurred the anastomoses were functional. There is no evidence that thrombosis in an infected field increases the susceptibility of the subject to a systemic bacteriemia. A thrombosed vessel will often canalize after quiescence of the bacterial invasion and thus restore a favorable percentage of function. It is felt, therefore, that the existence of unfavorable conditions met with in dirty traumatic wounds should not in themselves deter attempts at restitutional surgery. Temporary function also permits the development of a collateral circulation, which in physiological effect often accomplishes the desired end result.

Minimal size of vessel commensurate with average success. The limitations imposed by the physical relationship between vessel size and suture size permit the successful anastomosis of arteries far smaller than any vessel in adult man which may require anastomosing.

Coats of the vessel included in the stitch. The adventitia is weak and imparts little if any strength to the suture line. The adventitia also has a tendency to adhere to the suture material and may cause the suture to break, or it may be carried into the lumen of the vessel and cause intravascular clotting. It is not advisable to include the adventitia in the suture. This layer can be stripped back from the suture line readily. After completion of the suturing, the adventitia should be worked back to its former position. This enables the vasa vasorum to reestablish nutrient connections to the media. It is exceedingly difficult, tedious, and impractical to anastomose two arterial ends by sewing through the media without including the intima, although this can be done in a very large artery. It has been shown by numerous investigators that the intima may be included in the suture in successful anastomosis. Therefore, it is concluded that the suture bite should encompass the media and intima but not the adventitia.

Optimum spacing of the stitch. Sutures spaced 1 mm. apart will produce a leakproof repair, while wider spacing will not prevent leakage regardless of the type of suture or the size of the vessel. Spacing of sutures at 1 mm. is tedious so that many methods have been applied for the simplification of this problem. The most common method is the cuff technique of Gluck, the cuff extending for a considerable distance beyond both sides of the suture line. Experiments were carried out with 6 equispaced interrupted sutures and various types of material for cuffs. Thrombosis occurred with the cuff technique when autogenous jugular vein segments, rubber, fascia, peritoneum, viable muscle strands, and absorbable cellulose were used. Molding fibrinogen around the suture line and converting it to fibrin by the addition of thrombin produced a fibrin film cuff, but the fibrin film was unable to withstand arterial pressure. New possibilities in the application of cuffs may be available through the use of anticoagulants.

Optimum type of stitch. The simple continuous over-and-over stitch is the easiest one to place and gave the best results. The continuous mattress and the cobbler suture are a little slower and more difficult to place but when properly used they give dependable results. Single interrupted or interrupted mattress sutures may be used but the technique is unnecessarily tedious. The Connell suture and the baseball stitch were abandoned by the author. Two theories have been presented in favor of the mattress or cobbler suture. First, the mattress affords a more secure bite which minimizes the tendency for the suture to cut through the tissue. This theory has some merit. The second theory, that the mattress suture exposes less foreign material to the blood flow and minimizes tendencies toward intravascular clotting, was tested by experiments. It was found that the position of a fine strand of silk thread with respect to the blood flow and the size of the strand of foreign material are of great significance in relation to intravascular clotting. If a strand of fine thread is placed along the longitudinal axis of the vessel so that the thread hugs or recesses into the intima, no thrombus will form. If the thread lies transversely across the lumen of the vessel or if the end of the thread waves idly in the blood stream, a clot will form about the thread and propagate along the lumen. A propagating clot will also form, regardless of the position of the thread, if the thread is large enough to create turbulence in the blood flow. The author believes that the mattress suture does not have sufficient practical advantage to encourage its use over the much simpler and easier manipulated over-and-over stitch.

Evaluation of factors involved in intravascular thrombosis. These factors were investigated by devising a model circulatory system of glass which

made it possible to observe the mechanisms of flow, turbulence, and the effect of constriction. The axial and peripheral phases of flow could be observed. If a thread introduced into the lumen was small enough to remain in the clear peripheral zone, there was little evidence of turbulence. If the thread, because of its size or length, projected into the axial phase, pronounced turbulence would occur. The effect of a venturilike constriction was also studied and it was found that the turbulence produced distal to the constriction was capable of producing a propagating clot. These findings emphasize the observed facts that when good approximation without partial occlusion or distortion of the vessel is obtained with fine close suturing, no intravascular clot will form and the anastomosis will be successful.

Types of suture material. No catgut of a size comparable to No. oooooo silk is obtainable, and no actual anastomoses of arteries were attempted with catgut. Other experiments indicate, however, that catgut ligation tends to produce thrombus formation and intravascular clotting to a greater extent than does ligation with silk. It would appear that catgut would not be a suitable material even if it existed in the necessarily small sizes.

It is emphasized that even though thrombosis may occur postoperatively, the process is a slow one which admits of the establishment of an adequate collateral circulation so that the end result physiologically may be the same as though perfect technical results had been obtained. There are only a few technical fundamentals which must be adhered to: (1) use fine arterial needles and silk (No. oooooo); (2) keep the suture gap less than 1 mm.; (3) approximate the ends accurately; (4) use anticoagulants freely but judiciously; and (5) use mechanical aids, such as the soluble rod technique, when possible.

JOHN L. LINDQUIST, M.D.

BLOOD; TRANSFUSION

Neefe, J. R., Stokes, J., Jr., and Gellis, S. S.: Homologous Serum Hepatitis and Infectious (Epidemic) Hepatitis. Experimental Study of Immunity and Cross Immunity in Volunteers. A Preliminary Report. *Am. J. M. Sc.*, 1945, 210: 561.

Homologous serum hepatitis and infectious epidemic hepatitis have several characteristics in common. Both etiological agents pass through bacterial filters and are not destroyed by heat at 56° C for 30 minutes. Both also produce similar clinical manifestations. However, with infectious hepatitis the temperature is elevated above 100 degrees and transmission is common, the causative agent being found in the feces. Epidemic hepatitis may be prevented or attenuated by means of human immune serum, globulin, or human adult plasma. The presence or absence of cross immunity between the two diseases has not been established. Six human volunteers recovered from homologous serum hepatitis and failed to develop any acute clinical manifestations upon reinoculation of the causative agent of this disease, whereas 8 of 9 normal controls developed hepatitis and jaundice. The 6 volunteers were also inoculated with material containing the etiological agent of epidemic hepatitis and as a result 5 again developed hepatitis. Controls inoculated orally contracted epidemic hepatitis, but the controls which were inoculated parentally did not develop to the disease. The incubation period of serum hepatitis exceeded 60 days, whereas that of infectious hepatitis did not exceed 37 days.

The authors believed that the lack of cross immunity between the two diseases was due to differences in the antigenic properties of the two etiologic agents, which they believe were not identical. In the addendum, it was noted that recently 8 volunteers were found to be resistant to reinfection by the agent of infectious hepatitis for a period of 8 months after recovery from this same disease.

BENJAMIN G. P. SHAFIROFF, M.D.

LYMPH GLANDS AND LYMPHATIC VESSELS

Loseke, L., and Craver, L. F.: The Diagnosis of Hodgkin's Disease by Aspiration Biopsy. *Blood, J. Hemat.*, 1946, 1: 76.

Biopsy by means of aspiration through a needle has become an indispensable method of obtaining tissue for microscopic diagnosis at the Memorial Hospital, New York. The technique is now well established, and the method has been repeatedly described. The authors, herewith, report in detail, the steps of aspiration biopsy according to their technique. They state that, naturally, great care must be used: (1) in accurate localization of the tumor by means of straight posteroanterior and straight lateral roentgen films; (2) in fluoroscopic check of the position of the point of the needle; (3) in avoidance of trauma to the lung; (4) in avoidance of any reflux or injection of tumor material or air into the lung or into a blood vessel; and (5) in keeping the patient horizontal during the procedure, and very quiet for some hours afterward. Currently, a considerably greater number of intrapulmonary malignant tumors are yielding microscopic diagnoses as a result of aspiration biopsy rather than as a result of bronchoscopic biopsy, although the latter procedure is always given precedence unless it would obviously be useless.

Among 242 cases of histologically proved Hodgkin's disease treated at Memorial Hospital for the most part within the past 5 years, the diagnosis was established by open biopsy in 228, while aspiration biopsy yielded a reliable diagnosis in 14 cases.

In the 14 cases of Hodgkin's disease in which the diagnosis was made by examination of the sectioned clot obtained by aspiration biopsy, the material was from the lymph nodes in 9 cases, from a presternal nodule in 1 case, from the lung in 3 cases, and from the spleen in 1 case.

Among the 228 cases in which formal biopsy was used to prove the diagnosis, aspiration biopsy had

been previously attempted but had been unsuccessful in 11 cases. Thus in 25 cases of the total number of 242, aspiration biopsy had been selected as the first method on trial for good reason, and was diagnostically successful in 56 per cent of the group.

The authors conclude that in cases of Hodgkin's disease without enlarged peripheral lymph nodes, yet with nodes or masses accessible to needle puncture, the method of aspiration biopsy has often proved successful in establishing the diagnosis. Success depends in large measure on examination of a sectioned blood clot from the aspirated tissue by an experienced pathologist.

HERBERT F. THURSTON, M.D.

MISCELLANEOUS

Sarmiento, P. B.: Some Consideration Concerning the Surgical Treatment of Elephantiasis of the Extremities (Algunas consideraciones sobre el tratamiento quirúrgico de la elefantiasis de los miembros). *Rev. espan. cir., traumat. ortop.*, 1945, 3: 146.

The majority of authors agree that a primary irritation of the lymphatics predisposes to a septic infection which in extreme cases may lead to elephantiasis. The condition is characterized by an exudate rich in leucocytes, fibrous hyperplasia, and thrombosis and obliteration of the blood vessels in the subcutaneous tissues. In many instances no streptococci or parasites can be found and a special susceptibility of the lymphatic or lymphovenous system must be assumed. The causes of such abnormal conditions of the lymphatics may be of a local or general character.

As to the treatment of the condition, Cornachan suggested ligation of the main artery but the resulting necrosis soon discredited this operation. Winiwarter recommended a gradual compression of the main arteries but the same objection may be raised to this procedure as to ligation of the main artery. Buchoman suggested ligation of the main vein of the involved extremity, while Leriche recommended a periarterial sympathectomy basing his recommendation on the hypothesis of the existence of sympathetic fibers in the lymph vessel walls. Rogers advocates extensive removal of the involved tissues and insists upon the necessity of repeated interventions. Hanley described a procedure which he calls "lymphangioplastic", consisting of the introduction of silk fibers into the affected zone and extending them into normal regions. In this manner he expected to establish artificial capillary drainage from the involved to the healthy tissues. Le Dantec supplemented Hanley's procedure by immunization with a certain vaccine. Walther buries rubber tubing in the involved tissues, while Lanz extirpates extensive portions of the tissues and introduces fascial strips in order to establish drainage. Kondoleon suggested an extirpation of the aponeurosis in order to facilitate deep drainage. Payr and Oppel described similar methods. Castellani advocates daily injections of fibrolysin or acetosalicylic thiosinamine. Mata recommends the administration of streptococcus vaccine before any operative intervention.

The author operated on a 39 year old woman who developed a suppurative process in both inguinal regions at the age of 15 years. Following these lesions a tremendous elephantiasis of both lower extremities gradually developed. The author believes that repeated infections in the form of dermatitis, probably of a streptococcal origin, led to an infection of the lymph glands and lowered the resistance of the skin. Apparently repeated dermatitis with resulting lymphangitis produced cutaneous alterations and changes in the lymph vessels.

As to the treatment, the author employed a procedure consisting of resection of a large amount of tissue. He followed Sistrunk's technique modified by Kondoleon. In extensive cases of elephantiasis the operation must be performed in stages.

The author resected 9.5 kgm. of tissue under spinal anesthesia from the left extremity and a similar amount from the right extremity. Catgut No. 0 was used for ligatures and the tissues were approximated with catgut No. 3. A check-up 8 months later showed very satisfactory results.

JOSEPH K. NARAT, M.D.

SURGICAL TECHNIQUE

OPERATIVE SURGERY AND TECHNIQUE; POSTOPERATIVE TREATMENT

Ireneus, C., Jr.: The Hypochloremic State in Surgical Patients. *Surgery*, 1945, 18: 582.

Four cases are presented which illustrate an exception to the rule of withholding salt administration postoperatively. These cases are examples of severe hypochloremia following extensive burns, persistent vomiting from pyloric carcinoma with chronic high intestinal obstruction, and biliary obstruction, respectively.

The condition of hypochloremia is equivalent to "heat exhaustion" passing into the subacute or chronic phase due to persistence of the chloride loss. Clinical recognition of the hypochloremic state is difficult because of its rarity and the bizarre clinical picture it presents. The conditions most commonly associated with the loss of large quantities of electrolytes are gastroduodenal drainage, pyloric obstruction with vomiting, persistent external biliary fistula, high intestinal fistula, extensive granulating surfaces, persistent fever, and excessive sweating from a long operation during sultry weather.

The clinical manifestations of the hypochloremic state may be classified as either prodromal or advanced. The advanced symptoms are acute and similar to those of surgical shock and extreme prostration. They are usually characterized by a subnormal temperature of from 97 to 98° F., systolic blood pressure of 80 or below, and a soft, easily compressible pulse which is almost unobtainable. The skin is cold and clammy, and excessive thirst accompanied by extreme weakness and prostration is common.

The acute, advanced symptoms may be preceded for several days by the prodromal symptoms which consist of mild cramplike persistent abdominal pain, nausea, moderate abdominal distention, and repeated vomiting of small amounts of bile stained fluid. The patient may appear languid or drowsy and may develop an intractable hiccough. Anorexia is almost always present, and bowel movements or flatus are absent. Oliguria and uremic symptoms are fairly constant. The clinical similarity of the hypochloremic state to the picture presented by salt intoxication—the "acute abdomen," postoperative ileus, and intestinal obstruction due to nutritional edema—makes it extremely difficult to differentiate these conditions, except for the finding of a low blood chloride in the clinical conditions mentioned.

The importance of early diagnosis of the hypochloremic state is apparent, since the condition may rapidly progress to fatality from an extreme shocklike state with uncompensated alkalosis and extrarenal azotemia. Active therapy consists of massive fluid and salt administration, preferably by the intravenous route. Shock due to the acute hypochloremic state will not respond to the usual administration of blood, plasma, and nonspecific intravenous fluids. The Coller clinical rule for salt replacement and daily blood chloride determinations are accurate guides to treatment.

JOHN L. LINDQUIST, M.D.

Starr, I., and Mayock, R. L.: Convalescence from Surgical Procedures. Studies of the Circulation Lying and Standing, of Tremor, and of a Program of Bed Exercises and Early Rising. *Am. J. M. Sc.*, 1945, 210: 701.

The purpose of the authors' investigation was to search for objective abnormalities during convalescence from surgical procedures by available special techniques and by other methods which might be devised. If one could discover objective abnormalities they might be used as a test for the duration of convalescence and also as a means of judging the success or failure of attempts to shorten the convalescence, which was also part of the authors' project. In planning the work the authors expected that few abnormalities would be found when convalescent subjects were studied at rest, but when they were asked to perform tasks, it was expected that abnormalities would be discovered. For such tests, tasks that the patients were accustomed to were preferred. The first test consisted of observing the changes in the circulation which took place on arising; the second, of studying the effects of mild exercise, that of pushing up and lowering a weight. The results of the latter are reported elsewhere.

Forty-four patients were studied before and repeatedly after surgical operations. The test used consisted of estimates of the pulse rate, blood pressure, and cardiac output (ballistocardiogram) under standard conditions in both the horizontal and vertical positions.

The average of the results obtained in 25 cases operated upon for hernia disclosed that the following significant changes occurred during postoperative convalescence.

In the horizontal position the cardiac output was diminished soon after operation, and the blood pressure was diminished later. In the vertical position the pulse rate was increased, the cardiac output tended to be increased, and the systolic blood pressure tended to be diminished.

The difference between the lying and standing pulse rates increased, and the ratio between the lying and standing cardiac outputs was changed after operation. There was more tremor on standing, and occasionally the subjects were unable to remain standing after operation.

After more serious operations the changes found in convalescence were generally similar to those described after herniorrhaphy, with two exceptions:

(1) the administration of large amounts of fluid by vein prevented the postoperative fall of the cardiac output or caused it to increase; and (2) when the operation permitted better nutrition of the patient, improvement from this cause far overbalanced the effects of the operation per se.

JOSEPH K. NARAT, M.D.

ANTISEPTIC SURGERY; TREATMENT OF WOUNDS AND INFECTIONS

Lalich, J. J., and Mason, J. M., III: Resuscitation of Severely Wounded Casualties. *Surgery*, 1945, 18: 741.

During the North African and Tunisian campaigns and the Anzio-Nettuno beachhead operation in Italy, a great number of severely wounded casualties were observed. Many men came into the receiving tent with a blood pressure of 0/0. Their condition was judged by the manner in which they responded to transfusions of plasma and whole blood. It was believed that in cases in which the systolic pressure rose to 80 mm. of mercury and remained at that level the chances that the individual could undergo a major operation would be quite satisfactory. However, in cases in which there were compound head injuries, penetrating wounds of the chest or abdomen, or compound injuries of the femur, it was more difficult to get the casualties prepared for surgery. It was felt that plasma or blood could be given fairly rapidly. When the desired systolic pressure was not maintained reasonably, the patient was given a high priority for surgery. Hemorrhage was the greatest cause of a drop in the blood pressure in this group. Infection and cardiorespiratory embarrassment must be combated intelligently in association with severely wounded casualties. If and when the systolic pressure dropped in the preoperative and surgical phases of treatment, during the time blood or plasma was being injected, the drop in pressure was combated by increasing the amount and rapidity of the infusion.

When the systolic pressure reaches 100 mm. the patient should be given an additional 500 to 1,000 c.c. of blood, either preoperatively or during surgery, before resuscitation is considered adequate.

Three cases are reported in detail to illustrate the points brought out.

RICHARD J. BENNETT, JR., M.D.

Rawles, B. W.: A Routine for Early Skin Grafting of Deep Burns. *Surgery*, 1945, 18: 696.

This article presents the experience in the treatment of a group of 154 patients with burns in an overseas U.S. Army General Hospital in Italy, during a period of 14 months. Forty-two, or 27.2 per cent of the burn cases, required grafting as compared with 54 per cent of a group of 78 burn injuries previously reported, the great difference being due to the position occupied by the hospital in the chain of evacuation during the two periods. In a number of instances the burns were associated with injuries of the nerve, bone, and soft parts, since 33 per cent of the patients had been wounded in action. The author's study deals primarily with the late management of deep burns, since a majority of this group received the initial treatment in other medical installations, and were transferred to this hospital from a few days to several weeks after the injury.

The control of infection is of paramount importance at this time if prompt healing, with early and successful grafting, when indicated, is to be accomplished. Infection, besides jeopardizing the life of the patient, complicates the successful treatment of burns in the following ways: (1) the healing of second degree burns is delayed; (2) deep second degree burns with sufficient viable epithelium for complete coverage may be converted into third degree burns; (3) in third degree burns, deeper destruction of tissue occurs with an increase in scar tissue formation; (4) grafting may have to be delayed unnecessarily and may even be unsuccessful, and if so is followed by the formation of more scar tissue and contractures; and (5) even after the successful take of grafts, furuncles and pustular infection delay the healing of small uncovered "inbetween" areas and destroy portions of viable grafts days or weeks later. The problem, therefore, in burn therapy after shock has been overcome, is to control infection and obtain a closed wound as rapidly as possible either by the healing of undestroyed epithelium or by skin grafting.

Penicillin is used in the primary treatment of burns and is given intramuscularly in doses of 25,000 units every 3 hours. Infection is controlled in the majority of cases, provided the primary dressing is left undisturbed for from 12 to 14 days. It is the author's impression that oral sulfadiazine is just as dependable as penicillin during this stage of the treatment. Any drug therapy is only an adjunct to good surgical management (originally described by Allen and Koch) and, briefly, consists of (1) meticulous cleansing of the burned surface, and (2) a resilient pressure dressing with fine mesh grease gauze next to the burned surface. This should not be changed for from 12 to 14 days. Care is taken to splint adjacent joints and, in the case of the extremities, to see that the pressure dressings begin at the toes or finger tips and extend well above the burned area. Elevation of temperature occurs when this routine is used, but only on rare occasions is it necessary to change the primary dressing any earlier than 12 to 14 days for the purpose of inspection. All dressings are done in the operating room, under strict surgical technique and, if the burns are at all extensive, with the aid of an anesthetic. A majority of second degree burns are found healed when the primary dressing is removed, and there is only minimal contamination or infection in the case of deep burns. All loose, dead skin and the tops of unbroken blisters are removed in unhealed second degree burns, and a second petrolatum gauze dressing is applied and left undisturbed for another period of 10 to 14 days. Healing is complete in the majority of the remaining patients when the second dressing

is removed, except when there are areas of full skin destruction present which had not been previously recognized.

The recognition of full thickness burned skin and its prompt removal is necessary if grafting is to be done early. The identification of nonviable skin by means of sodium fluoroscein, and the excision of such areas, followed by immediate grafting when the burn is first seen or at the time the first or second dressing is done, has been suggested. The practice is to excise all or as much demarcated slough as possible at the time of the first change of dressing and thereafter at intervals of 3 or 4 days until all of it is removed.

In the author's experience, moisture often seemed to enhance the growth of bacillus pyocyaneus, proteus, and other contaminants, and macerated the surrounding skin edges. In June, 1944, at the suggestion of Lyons, he began applying dry, fine mesh gauze pressure dressings after the last slough had been removed, and continued or began giving penicillin intramuscularly, in doses of 25,000 units every 3 hours. The dressing is left undisturbed until the patient is taken to the operating room 4 to 6 days later for grafting. The additional time is used to bring the blood values to normal with transfusions of blood or plasma, as indicated.

The following advantages result from this routine: First, infection is controlled; second, grafting is more successful since infection is controlled and also because this routine makes earlier grafting possible; third, the patient's discomfort is greatly reduced by this simple routine; fourth, scar tissue and resulting contractures are diminished by early grafting; fifth, the amount of dressings, drugs, and other supplies necessary for treating a burn is reduced, medical personnel are freed for other duties, and many days of hospitalization are saved.

When this technique is used, the burn wounds are found covered with healthy granulations at the time of grafting, although 4 or 5 days previously the dissection was carried down to subcutaneous tissue. These granulations are not disturbed. However, in the patients admitted late, it is often necessary to cut the exuberant granulation away. Split-skin grafts are always used, and are removed either with the Padgett dermatome or with a modification of the Blair-Brown knife with a roller attachment. Grafts are not sutured in place except in the case of large dermatome sheets, when it is important to do so if stretch of the skin to the original size is to be obtained. It is the experience of the author that grafts become firmly adherent within a few minutes after being placed, because the necessary substances for adherence are present in the wound itself.

Furuncles and pustular infection is and about the grafted area can often be a problem. A wet dressing spreads the infection, macerates the skin, and many times leads to pyocyaneus and proteus contamination. All of this delays the healing-over of small "inbetween" areas or uncovered edges which are sometimes present when an extensive area must be grafted. In the author's experience, penicillin given parenterally does not control such infection when petrolatum gauze or wet dressings (with saline solution) are used; in fact, oral sulfadiazine seems to be more effective under these conditions. Recently, however, penicillin dressings have been used on the grafted area after the initial change of dressing whenever there has been much infection present. Strips of fine mesh gauze are wet with a solution of 250 units of penicillin to each cubic centimeter of normal saline solution and placed over the grafted wound. This is sealed over with petrolatum gauze to prevent too rapid absorption of the solution by the overlying dry dressing, and is changed once daily until the infection is controlled. This seems like a paradox since infrequent change of dressings during the acute stage of the burn, and previous to grafting, is stressed as being very necessary if infection is to be controlled. When dressings are not changed for 3 or 4 days, destruction of previously viable grafts results from the accumulation of pus, if pustules or furuncles are present in the grafted area. Furuncles and pustular infection after grafting were reduced by the use of penicillin dressings.

JOHN E. KIRKPATRICK, M.D.

Rubin, L. R.: Contiguous Skin Flaps for Wounds of the Extremities. *Am. J. Surg.*, 1945, 71: 36.

Closure of avulsed wounds in which the loss of skin and deep tissue is extensive may be effected by the use of tube and flap grafts, or by means of contiguous skin flaps. The author attempts to summarize, with the aid of drawings, photographs, and charts, his experience with 50 selected war wounds of the extremities closed by the various contiguous skin flap techniques.

The skin adjacent or contiguous to a wound is mobilized by the use of planned incisions which permit the contiguous skin to cover the defect after advancement, rotation, or transportation of the skin flap. Often extensive undermining opens large areas of tissue to bacterial invasion, but chemotherapy, particularly with penicillin, reduces this hazard. The author has also made use of multiple transfusions, where indicated, to aid wound healing.

This technique is applicable to wounds requiring new skin tissue which (1) will cover exposed bone, tendon, or deep irregular muscle defects, (2) will not adhere to underlying muscle when fascia is missing, and (3) will not contract. However, it is pointed out that skin manipulation beyond a certain point will so compromise the blood supply as to limit the use of contiguous skin flaps. To assure an adequate blood supply, the flaps must contain all layers of fat down to the deep fascia. The flaps are most successful where the skin is lax, as on the abdomen, back, and face. Only clinical judgment determines the limits of undermining for safe closure.

Buried absorbable sutures along with plaster of Paris splints are used to relieve the tension at the edges of a wound. Planned incisions are made along Langer's lines, and irregular wounds are transformed

into geometric designs (triangles and rectangles). Closures are effected to give figures H, Y, Z, T, etc. Wherever the position of the flap necessitates cutting across the main sources of blood supply, the author employs the technique of "delaying," which uses the principle of a gradual, rather than a sudden, reduction of blood supply. The flap, after being outlined through the skin, subcutaneous tissue and fat, is completely lifted from its bed, only to be replaced immediately and resutured in its former position until the blood supply at the base becomes adequate. This may require multiple stage operations.

Local anesthesia, even without adrenalin, should never be used. The injected fluid acts as a mechanical barrier to capillary circulation and, of course, adrenalin is contraindicated because of its vasoconstricting action. Brachial block for the arms and spinal anesthesia for the lower extremities are recommended. For individuals with a high vascular tone, who are sensitive to the vasoconstrictive effects of cold, pain, and trauma, use is made of lumbar paravertebral block (below) and stellate block (above).

Direct heat to an ischemic area favors necrosis because the local metabolic needs are more greatly increased than is the blood supply. Nevertheless, heat applied to the trunk of the body is beneficial by virtue of reflex vasodilatation in the extremities without an elevation of the local metabolic needs.

In instances of associated nerve injury it may be best to use a split skin cover immediately and to defer the flap closure until the nerve has been repaired.

The contiguous skin flap is designed primarily for utility and no attempt is made to obtain a cosmetic result. DAVID H. LYNN, M.D.

Newman, P. H.: Early Treatment of Wounds of the Knee Joint. *Lancet*, Lond., 1945, 249: 632.

This article deals with the treatment of wounds of the knee joint. The author classifies these wounds as slight, moderate, and severe, of which there were 10, 39, and 8, respectively. He discusses the diagnosis of the type of joint injury and the treatment.

In the first group, aspiration, intra-articular penicillin, and immobilization by means of a plaster cast was found sufficient. In the second group, careful wound incision, primary suture, intra-articular and parenteral administration of penicillin with immobilization, and extension in the Thomas splint were instituted. Among the 49 cases in these two groups there was only 1 case which gave him much difficulty.

In the remaining 8 cases falling in the "severe" classification because of the time element and contamination, 5 of the wounds were left open. The other 3 were closed and treated the same as those in the first 2 groups.

Foreign bodies were removed at the first operation whenever this procedure was reasonable and possible. A separate incision was found to be necessary in a few cases. The importance of preoperative roentgenographic films was stressed. The author also calls attention to the fact that nonradiopaque foreign bodies, such as wood and glass, may be a source of trouble. Frequently the history of the accident will put the surgeon on his guard in the last type of case. PAUL MERRELL, M.D.

Caldwell, G. A.: Secondary Infection of Wounds. *Ann. Surg.*, 1945, 122: 641.

Secondary infection following the original infection of an open wound is so commonplace as to pass unnoticed. The average surgeon accepts it as a matter of course and, unless the patient's life is endangered or his leg is about to require immediate amputation, he thinks nothing need be done to improve the situation. Actually, secondary wound infection is the principal cause of delayed healing and impaired function. Moreover, such infections are to a great extent preventable, and even established infections can frequently be eliminated.

Primary wound infections (to distinguish them from the secondary) are those caused by bacterial contamination at the time of injury. These bacteria are derived from soil, clothing, skin, and foreign bodies.

Secondary infections are those caused by bacteria introduced into the wound at any time after the initial injury. These invaders may come from the skin of anyone touching the wound, from unsterile instruments or dressings, or from the respiratory tract of the patient or of his attendants. They may fall into the wound with dust from the floor of a ward and may be drawn by capillary attraction through a soggy dressing which is in contact with soiled linen.

Only 5 per cent of fresh wounds were found to be infected with hemolytic streptococci and staphylococci and bacillus pyocyaneous upon admission to the hospital, but after a week in the institution 50 per cent of the wounds contained secondary invaders and later on they were found in from 70 to 80 per cent of the open wounds.

Pathogenic organisms can be eliminated in most cases by the body's defense mechanisms when these are aided by adequate surgical débridement. They persist as serious or trivial infections in from 10 to 25 per cent of cases. They appear as new invaders and produce serious and trivial infections in from 20 to 50 per cent of cases. Of the serious persistent infections developing in wounds, probably at least half are caused by bacteria secondarily introduced.

In view of these facts, the "laissez faire" attitude of surgeons toward secondary wound infections is not justifiable. Surgeons are correct in placing major emphasis upon the general condition of the patient and adequate drainage, but are incorrect when they ignore the changing bacterial flora in the wound under treatment.

Detailed modes of treatment including meticulous operative technique, supplemented by the administration of sulfonamides or penicillin before and after operation are described and illustrated by cases. HARRY W. FINK, M.D.

Birks, P. M.: Infections of the Superficial Palmar Space. *Lancet*, Lond., 1945, 249: 669.

The author presents 5 cases to illustrate the effects of incorrect and correct management of infections of the superficial palmar space. These infections have gained little recognition by virtue of their comparative rarity and the ill defined anatomical nature of the space. The space lies in the hand between the palmar fascia and the flexor tendons, proximal to the transverse crease of the palm. It is doubtful if it exists in the normal hand. According to Iselin, the boundaries of the superficial pretendinous central palmar space are:

Anterior: the palmar fascia

Posterior: the tendons and lumbrical muscles

Internal: the fourth intermetacarpal space

External: the union of the palmar fascia with the intermuscular aponeurosis of the second metacarpal

Proximal: the union of the palmar fascia and transverse ligament

Distal: the fusion of the middle palmar aponeurosis with the superficial transverse ligament

Fluid injected just through the palmar fascia mixes freely with fluid injected through the web of the middle finger into the middle palmar space. However indefinite this space may be in the normal hand, a collection of pus behaves as though it was confined between tendons and palmar fascia. In the early stage, extension of the infection occurs principally through the palmar fascia.

Clinically, in from 3 to 10 days after injury, the hand becomes painful and the palm swollen, especially proximally, and a purulent blister collects under the skin. The fingers are semiflexed, active movements are restricted and painful, there is little edema of the dorsum, but a great general upset.

The abscess should be opened before the palmar fascia sloughs (that is, early) under unhurried anesthesia and with a tourniquet. The incision should be over the most prominent part of the swelling and in the line of the crease. The fascia is opened with sinus forceps. The superficial palmar arch under the fascia is pushed out of danger by the pus. Tubes are unnecessary for drainage. The after care consists of immobilization on a wire splint with frequently changed dry dressings. DAVID H. LYNN, M.D.

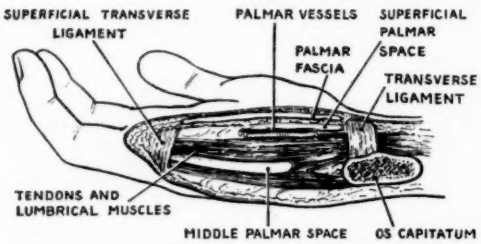

Fig. 1. Longitudinal section through hand (after Cutler 1942), showing anatomical position of the superficial palmar space.

Pratt, E. L.: Clinical Tetanus. *J. Am. M. Ass.*, 1945, 129: 1243.

The classification of 56 children with tetanus in the order of the severity of their infection was of use in evaluating the methods of treatment employed. There was no evidence that amounts up to 80,000 units of tetanus antitoxin was more effective than amounts of 30,000 units. The intrathecal administration of tetanus antitoxin was probably, but not definitely, more effective than the intramuscular or intravenous administration of the same amount of antitoxin.

Fatal reactions occurred from tetanus antitoxin given intrathecally to some patients, who, in all likelihood, would otherwise have survived their tetanus infections. Hence, tetanus antitoxin should not be used intrathecally in any but the most severe cases, if it should be used at all, until a preparation is available which is incapable of producing severe reactions.

Excision of the site of infection, once clinical symptoms of tetanus were present, did not ameliorate the course of the disease.

SAMUEL KAHN, M.D.

Neel, H. B., and Cole, J. P.: The Bacteriology of War Wounds in the Pacific Area. *U. S. Nav. M. Bull.*, 1945, 45: 1127.

A hospital ship in the Pacific area treated 2,740 fresh battle casualties in a little over one year. Culture of all of these wounds was highly desirable, but physically impossible because of the shortness of time, the large number of casualties, and the busy laboratory personnel. One hundred and sixty-one cases had wound cultures. These were severe wounds caused by shell fragments in 86 patients, bullets in 54, and unknown missiles in 21.

In contrast to civilian wounds, which are usually seen by a surgeon within a few hours, these wounds did not receive treatment for from 24 to 48 hours because of the ferocity of battle and the difficulties of transportation. Eighty-three patients in this group had their wounds cultured and were under treatment within 24 hours. An additional 30 patients were seen during the second 24 hour period.

Whenever possible, tissue was taken from the wound for culture. When it was not available, swab cultures were made on blood agar and tryptone broth for aerobic organisms. For anaerobic organisms, a dextrose-agar stab heated at 70°C. for 10 minutes, a meat infusion medium, a dextrose-agar stab unheated, and litmus milk were inoculated.

The authors' attention was centered on anaerobic cultures, and 160 wounds were cultured for anaerobic organisms. Of this group 77 (48.12%) were positive. The most frequent anaerobe cultured was the clostridium perfringens, present in 57 of the 77 wounds. Unclassified proteolytic anaerobes were present in 24 cases, and 23 wounds yielded more than one species of anaerobe. Clinical gas gangrene developed in 27 cases (35% of the anaerobically infected wounds.) and in 1 case which failed to yield anaerobes on the

admission culture. Clostridium perfringens was the offending organism in 26 cases of gas gangrene while the other case was caused by the clostridium septicum.

Direct smears from fresh wounds do not provide a reliable picture of the bacterial flora, so one must depend on cultures. Early information is essential, particularly in the case of anaerobes, in order to institute treatment before the infection gets out of control. The patients whose wounds yielded anaerobes were carefully observed and the earliest signs of clinical infection detected. This information led to early amputation and probably saved the lives of several patients.

Aerobic organisms were cultured from 120 wounds, and in only 14 wounds were the cultures negative. The staphylococcus albus was most often found. Wound infections, although frequent, usually remained localized. A case report of a serious complicating aerobic infection is presented.

The value of local implantation of sulfanilamide in the effort to prevent and control infection is doubtful. The authors did qualitative chemical tests on serum from the wounds of patients or on macerated tissue removed at débridement and found that sulfa drugs were present in 60.83 per cent of the wounds from which aerobes were cultured and in 57.14 per cent of the wounds from which anaerobes were cultured. Therefore, the local use of sulfonamide certainly is not bacteriocidal. The value of the drug as a bacteriostatic agent is more difficult to evaluate.

The wounds of 2 patients from which the clostridium perfringens was cultured were constantly irrigated with azochloramid solution, and sulfadiazine was given orally. One patient, in addition, received 640,000 units of penicillin. In spite of this regimen for 9 days, cultures of these wounds still yielded the clostridium perfringens, although neither patient developed gas gangrene. This would stress the fact that chemical sterilization of a wound is practically impossible. ROBERT R. BIGELOW, M.D.

Smith-Petersen, M. N., Larson, C. B., and Cochran, W.: Local Chemotherapy with Primary Closure of Septic Wounds by Means of Drainage and Irrigation Cannulae. *J. Bone Surg.*, 1945, 27: 562.

This article deals with a method of treating septic wounds, whereby the largest part of the wound is closed and cannulae are inserted through the superficial structures down to the septic process. Dakin's solution has been used extensively and even now is often substituted temporarily for other chemotherapeutic agents. Silver-pectinate solution has been used in a limited number of cases.

Penicillin has been used for the last year. The technique consists of primary closure of the wound around the cannulae, gauze sponges being packed between the skin and the flange. The dressings stabilize the cannulae. A number of cubic centimeters of penicillin are delivered from the supply bottle into the wound through the inlet cannula. The outlet cannula is left open until the clear fluid appears, then it is clamped off.

Penicillin is delivered into the wound every 4 hours. The strength of the solution is 250 units per cubic centimeter. The period of administration varies from 2 to 4 weeks. Dressings are infrequent. The cannulae are removed under pentothal anesthesia and the soft tissue defects are closed, leaving only a small rubber catheter in place for the administration of penicillin for a few more days. Systemic chemotherapy is used in conjunction with the local chemotherapy. The usual dosage is 100,000 units for 24 hours. Four cases are reported:

CASE 1. A boy 13 years of age had recurring osteomyelitis of the left fibula. The suggested technique was followed, and the wound healed completely in one month.

CASE 2. A man 24 years of age had recurring symptoms referable to his right ulna. Roentgenograms showed changes characteristic of osteomyelitis. Operation consisted in sequestrectomy, saucerization, and insertion of glass cannulae. The wound healed completely in 5 weeks.

CASE 3. A man 38 years of age had rheumatoid arthritis with a rigid spine and fibrous ankylosis of both hips. In 1934, he had had a fascia lata arthroplasty of the left hip with postoperative sepsis, which had persisted for a period of 5 years. During a vitallium-mold arthroplasty, free pus was encountered in the iliac fossa and treated. There has been no recurrence of sepsis for 6 years.

CASE 4. A man 19 years of age had multiple foci of osteomyelitis occurring over a period of 7 years. In July, 1944 acute symptoms from a new focus in the mid-shaft of the right femur developed. Operation included saucerization and insertion of 2 vitallium cannulae, with wound closure. Ten months have elapsed since operation and so far there has been no local recurrence of sepsis.

The authors state that this is not a perfected method with 100 per cent cures. There have been cases with local recurrence of sepsis but these have been relatively few.

A number of figures and roentgenograms showing the method in use are included.

RICHARD J. BENNETT, JR., M.D.

Woodward, F. D., and Holt, T.: The Local Use of Penicillin. *J. Am. M. Ass.*, 1945, 129: 589.

The local use of penicillin has proved helpful in the control of acute and subacute infections of the nose, sinuses, nasopharynx, pharynx and mouth, and has been of occasional benefit in certain cases of chronic otitis media. It has also proved beneficial postoperatively in mastoid and sinus surgery.

It has been of no value in the treatment of acute otitis media, and of negligible or no value in chronic sinusitis, and chronic sinusitis associated with allergic rhinitis.

Its usefulness in the treatment of the common cold is still undetermined.

In those cases in which the local use of penicillin has proved beneficial, its effect will no doubt be enhanced by its combined use systematically, or by the combined use of an appropriate sulfonamide.

The local application of penicillin does not produce any dramatic change in the bacterial flora present in the nose and throat. Its effect seems to be more bacteriostatic in nature than bactericidal. In the cases of several patients who had recently recovered from scarlet fever, the authors were unable to alter the bacterial flora on repeated cultures, after local treatment.

The solution, 500 units per cubic centimeter, and lozenge provide the simplest and most effective means of application. The watersoluble jelly was useful at times for instillation into the nose at bedtime and in the treatment of atrophic rhinitis, in which the nasal symptoms were ameliorated.

The authors are hopeful that new antibiotics will soon be available, particularly for the gram negative organisms and for the more common bacteria which have become sulfonamide- or penicillin resistant.

JOHN J. MALONEY, M.D.

Romansky, M. J., and Rittman, G. E.: Penicillin Blood Levels for 24 Hours following a Single Intramuscular Injection of Calcium Penicillin in Beeswax and Peanut Oil. *N. England J. M.*, 1945, 233: 577.

A single injection of 300,000 Oxford units of calcium penicillin in 4.8 per cent beeswax (by weight) in peanut oil contained in 1 c.c. produces and maintains effective levels of penicillin in the blood for about 24 hours, and continues to be excreted in the urine for approximately 3 days.

Calcium penicillin in beeswax and peanut oil maintains its potency for at least 9 months at refrigerator and room temperatures up to 37° C. In addition, there is no deterioration after 24 hours at 56° C. or after two hours at 100° C.

BENJAMIN GOLDMAN, M.D.

Cormia, F. E., Jacobsen, L. Y., and Smith, E. L.: Reactions to Penicillin. *Bull. U. S. Army Med. Dept.*, 1945, 4: 694.

The authors' study deals with the serious and unusual reactions observed in some 2,000 soldiers receiving prolonged courses of penicillin. In about 0.5 per cent of this group, the reactions were so severe that the penicillin was discontinued. The reactions are classified as follows: (1) urticaria, complicated by (a) angioneurotic edema, (b) shock, (c) convulsions, and (d) psychotic depression; (2) a syndrome similar to serum sickness; (3) acute syncope; (4) transient miliarialike eruptions; (5) erythematovesicular eruptions, at times simulating dermatophytosis; (6) erythema nodosum; and (7) epididymitis.

The reactions to penicillin have been of two main types—those appearing shortly after first exposure to the drug, and those occurring at a later date as a result of developing sensitization. Those in the first group are due to pre-existing hypersensitivity to penicillin, which may be inherent or may occur as a result of a previous fungus disease. Those in the second group may occur later in the first course of treatment, shortly after its termination, or at various times during subsequent courses. The reactions in this group are indicative of a developing sensitization to penicillin. Here again, previous fungus disease may enhance the development of reactiveness to penicillin.

Both early and late reactions may be serious in nature and require discontinuation of the therapy. From clinical observations, it appears that the primary shock tissue in most penicillin reactions is the vascular bed.

Intradermal testing with penicillin has been of limited value as an aid in diagnosis or guide for further treatment. Increased reactivity to penicillin may occur on the basis of a previous acute fungus disease.

The presence of negative intradermal tests during and subsequent to some of the more serious reactions indicates that clinical judgment in each case is more important than the information obtained from skin testing.

JOSEPH K. NARAT, M.D.

ANESTHESIA

Rovenstine, E. A., and Hershey, S. G.: The Utility of Apomorphine in Clinical Anesthesia. *Anesthesiology*, 1945, 6: 574.

The use of apomorphine as a sedative has been limited and it is the purpose of this report to suggest more extensive use of the depressant properties of this drug for several types of cortical stimulation as seen by the anesthetist.

Apomorphine in subemetic doses is a valuable therapeutic aid for such conditions as emergence delirium, acute alcoholic psychoses, or patients with developed or impending delirium tremens, drug addicts, and excitability following the use of belladonna alkaloids.

The hypnotic action of this drug is prompt, dependable, and safe. Sedative effects become apparent in a few minutes with the reduction or cessation of agitated muscular movements. The blood pressure, pulse, and respiratory rates are constant with whatever changes may result from the elimination of the state of excitement.

Apomorphine hydrochloride is marketed in tablet form, and is subject to Federal regulation as a narcotic. It is relatively unstable and should be discarded if a greenish tinge is visible when it is diluted. The sedative or hypnotic action of the drug has had little stress in most texts. Present clinical experience shows that subemetic amounts are free from the described hazards of respiratory and circulatory collapse. The drug is readily absorbed from all mucosal surfaces but its action is more certain when given parenterally.

The report is based on more than 300 administrations for the therapy of emergence delirium. It was

also used as premedication for emergency operations complicated by severe excitement and acute alcoholism, delirium tremens, and severe agitation accompanying morphia addiction. Another field of usefulness was for the marked muscular and psychic overactivity occasionally seen before operation after the hypodermic injection of scopolamine or atropine.

Six case reports were given in detail illustrating the types of cases which showed response to the drug. It was not given as a substitute for other depressant drugs except in the special circumstances mentioned. Experience with the drug was limited to surgical patients. There were no accidents or untoward effects.

The dose varied from 1 to 2 mgm. for the average adult patient. It was dissolved in 10 c.c. of sterile normal saline solution and administered intravenously. It was safe to repeat half the amount if sedation was inadequate after 20 minutes, and the entire initial dose could be repeated should the excitement reoccur after several hours.

The drug was contraindicated when either asphyxia or oxygen want seemed to be the important factor in the excitement or delirium.

MARY KARP, M.D.

Koppanyi, T.: Acetaldehyde, a Volatile Anesthetic and Sympathetic Stimulant. *Anesthesiology*, 1945, 6: 603.

This report concerns the effect of acetaldehyde when administered by inhalation. The product used for the study was freshly distilled from paraldehyde in the presence of sulfuric acid and water, and adult dogs were the subjects. An undiluted or 30 per cent aqueous solution of acetaldehyde was applied by means of a cone or towel wrapped around the nostrils and mouth. Anesthesia was established within 5 minutes, the trachea cannulated, and the common carotoid artery exposed and cannulated for recording the blood pressures.

Recovery usually occurred within an hour and was uneventful. Toxic effects of an overdose included profound cardiac slowing which was in part due to central vagus stimulation and idioventricular rhythm. Conventional resuscitating measures were usually successful in saving the animals.

Preliminary medication of morphine or barbiturates reduced the quantity of acetaldehyde needed for the anesthesia. The rate and depth of respiration were increased and there was a substantial rise of the blood pressure. There were sympathetic stimulating actions of the drug in addition to the central depressant action, for it produced all signs and symptoms of typical thoracolumbar autonomic excitation such as pupiliary dilatation, relaxation of the duodenal muscles, and dilation of the bronchial musculature.

The drug is a local irritant to the skin and mucous membranes, but this action is less than that of chloroform. Its odor may be made less offensive by the addition of various volatile oils or ammonia water. Acetaldehyde ammonia is a pressor agent and a general sympathetic stimulant, while acetaldehyde sodium bisulfite is not. The inhalation of concentrated acetaldehyde vapors is likely to produce cardiac, vascular, and respiratory toxic effects.

MARY KARP, M.D.

Thornton, H. L., and Rowbotham, S.: Anesthesia in a Maxillofacial Surgical Unit with the British Liberation Army. *Anesthesiology*, 1945, 6: 580.

This article is based on the problems encountered and the anesthesia method employed on 1,687 patients with maxillofacial injuries as encountered by one maxillosurgical unit in England during World War 2. The types of injury usually found were classified into the "blow-out" injury, the through and through injury to the maxilla with disorganization of the nasal passages, the retained foreign body in the tongue, the "brawny neck," edema of the glottis, direct involvement of the glottis and larynx, and injury involving soft tissue alone.

The premedication for the average case was omnopon (grain ⅓) and scopolamine (grain 1/150) given subcutaneously 1 hour before or intravenously a few minutes before the operation. The nose was cocainized just prior to the injection of anesthesia and the larynx under direct vision prior to passing a tracheal tube.

Induction presented the greatest problem in this type of anesthesia because of the difficulty of placing a mask on the face. The airway was often obstructed partially or completely, and there was a tendency to laryngeal spasm. Anesthesia by inhalation was found difficult and intravenous anesthesia was the obvious alternative. A 1 per cent solution of bromethyl (avertin) in 5 per cent glucose when given intravenously produced rapid anesthesia which was highly satisfactory for intubation. The solution was warmed to blood heat and tested with Congo red before use. No laryngeal spasm or strangling was observed in any of the cases and there was early relaxation of the jaw.

Intubation was safely effected in the early second stage. The dosage infused varied considerably but the average case was intubated on 300 c.c. There was no cause whatsoever for anxiety regarding the safety of the drug in the cases presented, with the exception of 1 case which was reported in detail. Death may have been due to primary heart failure.

For intubation the nasal route was most commonly chosen and the procedure was carried out under direct vision in almost all cases. The endotracheal tubes used were plasticised polyvinyl chlorid (portex). The advantages of this type over the standard rubber type were the remarkable durability of the tubes, ease of sterilization, freedom from kinking, reduced irritability to the larynx which permitted the lightest possible anesthesia, and the unusual property of the material which enabled it to be modified to individual requirements after it had been softened by boiling.

A wide-bore endotracheal connection which connected the tubes to the anesthesia apparatus was described. The author preferred packing off the pharynx under direct vision, with a 3 inch open woven bandage soaked in liquid paraffin, rather than the inflatable cuff.

The technique of anesthesia used for several types of injuries was described. Care was taken to treat hemorrhage and shock, and to stabilize the patient's blood pressure at 100 mm. of mercury or above, before the operation was started. Great stress was made on the need for providing an unobstructed airway in all cases. Sometimes intubation and tracheobronchial suction without anesthesia was necessary to take care of the anoxic emergency.

Pentothal was employed before bromethyl came into use. The technique of its use was described. The tendency to laryngeal spasm was the main drawback to this agent. Although preliminary tracheotomy under local anesthesia as a routine procedure in cases of injury to the larynx, edema of the glottis, and brawny edema of the tongue prior to the induction of general anesthesia, was an open question among anesthetists, deliberate tracheotomy was performed as an emergency.

The anesthetic was kept as light as possible throughout the procedure so that the return of the reflexes was as rapid as possible. The maintenance of the anesthesia once induction was completed was usually carried out by a closed technique of carbon dioxide absorption with nitrous oxide-oxygen ether, cyclopropane, or ether with the Oxford vaporizer. When the anesthesia was terminated every effort was made to provide and maintain a free airway. Often tracheotomy was performed after the operation was completed. The nasal, pharyngeal or oral airway was always left in place in those patients who did not have tracheotomy. The postoperative care of the patient was of utmost importance and revolved around the maintainence of a free airway. In some instances it was necessary to retain the endotracheal tube for periods of time before it was removed. The patient was placed on his side with the head slightly extended, until fully conscious. Suction was always available, obstruction was avoided under all circumstances, and care was taken not to depress the respiratory center with too much sedation.

A short recovery period was considered essential, as was individual skilled supervision until the patient was conscious. MARY KARP, M.D.

Livingston, H. M.: The Present Status of Ethylene-Oxygen Anesthesia. *Ann. Surg.*, 1945, 122: 1071.

The data presented concerns a general evaluation of 18,250 operations done under ethylene anesthesia in which 11,560 cases had ethylene-oxygen alone. A detailed study was made of the last 3,210 consecutive operations done under ethylene-oxygen.

The history of the drug was described extensively and the present physical, physiological, and pharmacological results of its use were reviewed.

As to the fire and explosion hazard of the agent it was concluded that the drug showed the same inherent explosive quality that is present in all inhalation agents except chloroform or nitrous oxide.

The author emphasized the quiet smooth induction of the anesthetic; the lack of effect on the red cells, hemoglobin, and the coagulation time or character of the blood clot; and the carbon dioxide combining power of the blood, blood urea, and icteric index. The reaction to ethylene-oxygen was found to be only moderate without asphyxia, and was limited to the second plane of surgical anesthesia. The amplitude of the contractions of the stomach, small intestines, and colon were increased without change in tone, and there was depressed gastric secretion with delay in the emptying time of the stomach. Death was due to asphyxia with respiratory failure before cardiac failure.

Ethylene produced no spasm due to direct irritation. Electrocardiograph studies showed no evidence of disturbances in cardiac automaticity or conduction. There was no marked stimulation or depression of the vagus center. Ethylene and procaine gave the lowest incidence of arrhythmias in human beings.

There were no anesthetic deaths reported in the series.

Premedication included morphine sulfate (gm. 0.010 to 0.015) given hypodermically and calcium nembutal (gm. 0.18 to 0.27) per rectum given 1½ hours before anesthesia.

A detailed tabulation was made of the 50 deaths which occurred following the 3,210 operations. The author believed that an excellent test of the drug was made in the series reported because of the major character of the surgical operations performed. There was a notably low incidence of circulatory and respiratory complications. Vomiting was minimal in comparison with ether.

The author concluded that ethylene-oxygen seemed to be definitely a preferable inhalation agent for the poor risk patients, including those with cardiopulmonary mechanisms. The reported death rate of ethylene was lower apparently than that of any other inhalation agent. The main drawback of this anesthetic was its deficient muscular relaxation for the average patient. MARY KARP, M.D.

Fiehn, G.: Percaine Spinal Anesthesia Combined with Evipal Narcosis. *Acta chir. scand.*, 1945, 92: 557.

The author reports 500 spinal anesthesias with percaine (nupercaine) in 1 to 1500 dilution combined with evipal narcosis. The method affords ideal working conditions in abdominal surgery, without extension of the spinal anesthesia to dangerous heights. It reduces the risk of both individual agents. It is humane, especially for the anxious patient. It provides for the immediate use of fluids should a critical condition arise because the needle is in place in the vein. It presents no complicated apparatus, and it secures a more placid awakening.

Length of spine cm.	Percaine 1:1500 Male c.c.	Female c.c.
56	18	16
54	17–18	15–16
52	17	15
50	16	14
48	15	13
46	14–15	12–13
44	13–14	11–12
42	13	11
40	12	10

The technique is described in detail. One and one-half cubic centimeters of tetrapon (2% solution) (similar to pantopon) and 10 cgm. of ephedrine were given subcutaneously before operation. The patient was placed in a lateral decubitus position and spinal tap effected. The volume of percaine given was determined by means of the above table:

The solution was injected at the rate of 4 c.c. per minute. The needle was left in place in the subarachnoid space, and after from 5 to 10 minutes the height of analgesia was tested. If the analgesia was too low, a supplemental dose of from 2 to 6 c.c. of percaine solution was administered, the needle removed, and the patient turned on his back in a horizontal position or in a few degrees of the Trendelenburg position. Infusion was then initiated and evipal sodium in a 10 per cent solution was injected at approximately 1 c.c. per minute. The aim, as a rule, was to keep the patient dozing. Saline solution was administrated to maintain patency of the needle.

In 91.2 per cent of the cases the effect of the combination of drugs was considered ideal; 8.2 per cent were considered to have a moderate effect and 0.6 per cent had a poor effect. The effect was poorest in men in the age group between 30 and 49 years and in operations above the umbilicus. In 4 cases the evipal produced a mild excitation.

The dose of percaine averaged 19.4 c.c. in men and 17 c.c. in women in operations above the umbilicus and 16.7 c.c. and 15.9 c.c., respectively, in operations below the umbilicus. The largest dose was 32 c.c. administered to a man of 37 years for gastrectomy. The average dose of evipal was 8.6 c.c. Twenty-three patients slept satisfactorily on 3 c.c., 15 on 2 c.c., and 1 patient even on 1 c.c.

Complications arising from the combination were few. The blood pressure in most cases remained constant in spite of limited usage of the Trendelenburg position. Eighty-seven per cent of the cases showed a partial fall which did not exceed 30 per cent; 10.8 per cent exhibited a fall between 31 and 50 per cent; and 2.3 per cent exhibited hypotension of over 50 per cent. In most cases no changes were demonstrable in the respiration and the pulse also remained unchanged. Vomiting occurred more rarely than in spinal anesthesia alone. Headache was present infrequently.

In 15.6 per cent of the cases the postoperative retention of urine exceeded 24 hours. This high percentage was considered possibly due to the wide use of morphine medication. There were 4 deaths during the first 24 hours, but in no case was anesthesia considered a factor. One death which is perhaps ascribable to the combination anesthesia occurred before the operation was completed.

Parathesia occurred in 1 patient on the seventh day after operation; it was localized to the radial side of the right thumb. Pneumonia was a postoperative complication in 4 cases, 3 of which had a fatal outcome on the seventh, ninth, and eleventh days, respectively.

The drawbacks to the method include the somewhat long preparation, the need for an experienced anesthetist besides a nurse at the head of the patient, and the possibility of unilateral anesthesia.

The method was contraindicated in liver damage, shock conditions, and severe morbus cordis, sepsis, tuberculosis, and syphilis. MARY KARP, M.D.

Fairclough, W. A.: Sixth-Nerve Paralysis after Spinal Analgesia. *Brit. M. J.*, 1945, 2: 801.

The author briefly reviews the literature concerning the occurrence of sixth-nerve paralysis following spinal analgesia, and reports that in a series of 2,021 spinal anesthesias 10 instances of partial paralysis were noted. Of all cranial nerve palsies following spinal analgesia, abducens paralysis constitutes well over 90 per cent of those reported. The various theories which have been advanced to account for the vulnerability of the abducens nerve are listed and all of them attribute it to the purely anatomical disadvantages of this nerve.

A new theory is then suggested as to the possible cause for the frequent paralysis seen in this nerve. The factors necessary in binocular stereoscopic single vision are listed and the frequency of some disturbing factor in this complex mechanism is mentioned. Phylogenetically binocular vision is a recently acquired sense and presumably the first lost. The early occurrence of diplopia in unpremedicated inhalation anestheisa and in inebriation is mentioned as an example of the upsetting by a toxic substance of the normal physiological balance necessary for binocular single vision. It is pointed out that the normal power of adduction of the two eyes is three times as strong as the power of abduction. Esophoria is a common form of muscle imbalance. The loss of a part of the tonic impulses conveyed by the abducens nerve could then easily upset the balance and make manifest a squint that had been latent until the introduction of the spinal anesthetic. To explain why most such pareses are unilateral, the author states that when the effort to maintain binocular vision is abandoned the second eye is often able to carry on monocular movements normally with the less powerful stimulus being transmitted over the abducens nerve.

Ten cases of partial transient unilateral paralysis of the abducens nerve following spinal analgesia (spinal percaine 1/200—from 1.5 to 3 c.c.) are reported with brief abstracts. Nine of the patients, examined after their vision was subjectively normal, had an esophoria varying from 1 to 5 P.D. at 6

meters and none had exophoria. The diplopia appeared in from 5 to 11 days after anesthesia and persisted from 2 weeks to 14 months. Covering the affected eye gives relief but is not advised as the removal of the stimulus toward fusion and the redevelopment of binocular vision is thought to retard recovery. Dark glasses with a covering over the outer third of the glass covering the affected eye are recommended. Muscle exercises and fusion training may be found necessary in those cases in which a natural recovery is delayed.

THOMAS DOUGLASS, M.D.

Engstrand, L., and Friberg, O.: On the Function of the Liver as Affected by Various Operations and Anesthetics. *Acta. chir. scand.*, 1945, 92: 5.

The liver function was studied postoperatively by means of a series of tests of hippuric acid synthesis (intravenous test) in association with a number of different operations and forms of anesthesia. There was a considerable dissertation on the physiology of the liver and the methods available for the study of its function.

The first group of experiments was made on cases subjected to high spinal anesthesia. It was shown that there was a reduction in the liver function in those cases of high spinal anesthesia (with percaine) in which a fall in the blood pressure occurred. The cause was considered to be an anoxemic injury to the liver.

No reduction of liver function was found with inhalation narcosis; with ether a fairly great reduction was observed, persisting in most cases for more than a week after the operation. In abdominal operations ether narcosis always appeared to reduce the liver function even when there was a high glycogen content in the liver during the narcosis and when an adequate supply of oxygen was given during the anesthetic.

The reduction of the hippuric acid synthesis varied according to the magnitude of the operation. Cyclopropane was the anesthetic which was least harmful to the liver, even in cases showing a strong reduced liver function preoperatively.

When narcotal nitrogen-monoxide (nitrous oxide) was used with from 15 to 20 per cent oxygen or less, a decrease in the liver function test was manifest, but none appeared when the oxygen administration was 20 per cent or over.

Preoperative and postoperative management with respect to the liver was discussed and the hippuric acid test evaluated. In the cases with strongly reduced liver function it was found important to treat the liver preoperatively for from five to seven days with carbohydrates and proteins, fats being excluded from the food; glucose was then given subcutaneously on the morning of the operating day. Cyclopropane was considered the anesthetic of choice and an abundant supply of oxygen was continued throughout the operation. Postoperatively a glucose drip was retained for from 4 to 6 days, and plasma transfusion was administered in the cases with disturbances of the serum protein content. From the third postoperative day on, fat was included in the food along with a high carbohydrate diet. Although cyclopropane was the agent of choice in these cases, local anesthesia plus narcotol-nitrogen monoxide oxygen could be employed if adequate oxygen was administered throughout, but ether was definitely contraindicated.

MARY KARP, M.D.

PHYSICOCHEMICAL METHODS IN SURGERY

ROENTGENOLOGY

Bannen, J. E.: The Investigation of Free Gas in the Peritoneal Cavity. *Brit. J. Radiol.*, 1945, 18: 390.

Free gas distributed via the abdominal route may be found and demonstrated by x-rays as follows:

1. In the peritoneal cavity including the lesser omental sac:
   a. Following abdominal operations
   b. After tubal insufflation
   c. After vigorous vaginal douching
   d. In acute perforations of the gastrointestinal tract.
   e. Because of gas forming organisms in subdiaphragmatic and other infections
   f. Following injury.
2. In the retroperitoneal space:
   a. Because of perforating posterior duodenal ulcer
   b. Because of escape of gas from the small bowel through mesentery
   c. Because of injury (especially to the second and third part of the duodenum).
3. In unusual locations such as in the root of the transverse mesocolon, the root of the small bowel mesentery, subcutaneous tissues of the flanks, the mediastinum, and in the paravertebral tissues of the chest.

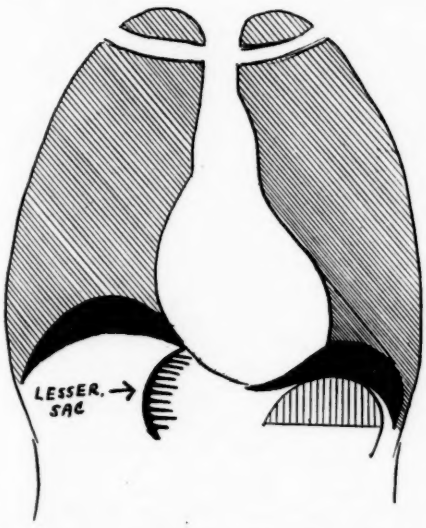

Fig. 1. Position of free intraperitoneal gas when the patient is in the vertical position. The position of the right border of the gas distended lesser sac is shown.

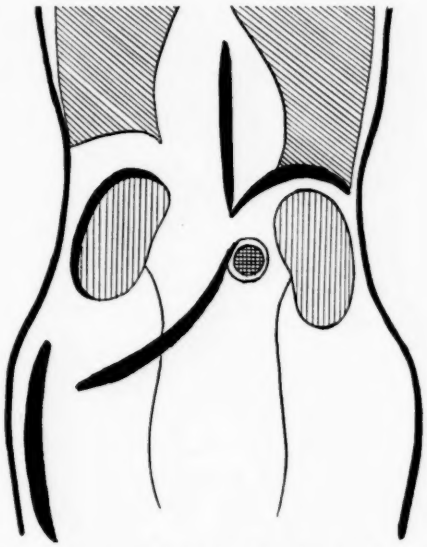

Fig. 2. Diagrammatic sketch showing distribution of retroperitoneal gas in posterior perforations or after injury to the parietal peritoneum

The use of a bedside portable roentgen unit is recommended. Correct positioning of the patient and the film in order to allow the gas to gravitate into a favorable location is essential for satisfactory raying. Early raying is advisable because in certain cases the gas may disappear 24 hours after a perforation has sealed. Cases of group 1 may be distinguished from cases belonging to the other 2 groups by the free mobility of the gas in the former.

GERHART S. SCHWARZ, M.D.

MISCELLANEOUS

Bessemans, A., Wittebolle, P., and Gelens, A., Intra-Auricular Temperature and the Thermic Criterion of Physicopyrexia (La température intra-auriculaire et le critère thermique de la physicopyrexie). *Rev. belge sc. méd.*, 1945, 16: 221.

Jongbloed and Noyons developed a new method of estimation of the intracerebral temperature by measuring the temperature of the auditory canal with the thermocouple. The knowledge of intracerebral temperature is important in the physicopyrexic treatment of neurosyphilis.

The authors of this article found that intra-auricular thermometry is inconvenient and offers no advantages when the lesion to be treated is located outside of the brain. They employed the so-called

"deep body thermometer" in 5 rabbits to compare the rectal temperature with that within the auditory canal. The rabbits were placed in an inductotherm and the rectal temperature was measured with a deep body thermometer. It was found that in the beginning the body temperature falls progressively, because of immobilization. In spite of an increasing outer temperature, the body temperature continues to fall, possibly because of a defensive reflex in the form of a vasoconstriction. Gradually the temperature begins rising. The temperatures of various tissues increase at different rates. Individual variations are not rare. It is impossible to judge the temperature of one region on the basis of the temperature of another region. During the hyperthermia treatment, rapid rise or fall of the temperature within the auditory canal without a plausible cause may be observed. Such fluctuations of the temperature within the auditory canal are not parallel to the rectal or cerebral temperature. The rectal temperature is the only one that rises rapidly and progressively with artificial hyperthermia.

In order to form a definite idea concerning the effect of artificial heat on a localized agent, such as infectious micro-organisms, it is necessary to measure the temperature *in situ*, i.e., at the involved site. For practical purposes, the rectal temperature furnishes more exact information as to the body temperature than the temperature taken at any other place of the body.

JOSEPH K. NARAT, M.D.

Smith, B. C., and Quimby, E. H.: The Use of Radioactive Sodium As a Tracer in the Study of Peripheral Vascular Disease. *Radiology*, 1945, 45: 335.

The value of artificial radioactive elements as "tracers" is now generally recognized. Atoms of a radioactive isotope of any element can be administered to a living organism and their circulation traced by measuring the intensity of the radioactivity produced at various points. It is thus possible to "tag" at will any desired substance by mixing with the stable atoms a relatively very small number of radioactive atoms.

The authors performed a series of investigations with radioactive sodium (Na^{24}) as a tracer in 200 patients with peripheral vascular disease. A few cubic centimeters of normal saline solution containing the radioactive isotope were injected into the cubital vein and the circulation traced down to the feet by measuring the radioactivity with the Geiger-Mueller counter.

The radioactive sodium was prepared in the Columbia University cyclotron by bombarding sodium metaborate with deuterons. The metaborate containing the active atoms was dissolved in water, acidified with hydrochloric acid, and treated with methyl alcohol, which resulted in the formation of methyl borate, sodium chloride, and water. The solution was evaporated until it was dry and heated to remove excess acid; the material was then dissolved in pyrogen-free distilled water to give the desired concentration for injection, and autoclaved for an hour.

The Geiger-Mueller counting tube was enclosed in a shield of ½ inch lead, with a thin aluminum window 7 by 5.5 cm., which was placed against the part of the body to be measured, as the patient lay comfortably in bed. The predetermined dose of isotope was, as a rule, 100 microcuries in from 5 to 12 c.c. of solution. Certain technical precautions were necessary, which are briefly described.

In measuring the radioactivity, attention was paid to two factors. First, the interval from the start of the injection to the time of the arrival of the radioactive substance at the tissues in contact with the counter was determined. If the counter was placed against the distal plantar metatarsal region of the foot, this interval was called the arm-to-foot circulation time. The arrival of the radioactive substance was signaled in the counter by a definite increase in the number of knocks. However, if the circulation, as for example in arteriosclerosis, was slow, it was often found difficult to estimate just when the material arrived. Therefore, systematic 5 second counts were found to be more advantageous. Second, it was noted that when the counting was carried on minute by minute, the knocks increased steadily and markedly for some time. This was attributed to the interchange of plasma and extravascular fluid until the equilibrium was established and was called the "build up curve." It soon became evident that the shape of the build up curve gave valuable clinical information relative to the condition of the walls of the arterial vessels maintaining the viability of the part examined.

Counts were taken also at other positions, such as the calf, popliteal region, and thigh, and in many instances they were made bilaterally.

Practically all types of known peripheral vascular diseases were studied. The arm-to-foot circulation time in 131 cases is tabularly presented in the original article. The average value was found to be 39 seconds, with 15 seconds, and 105 seconds as the two extremes. In general, the longer intervals were noted in the more advanced stages of the disease. However, the equilibrium build-up curves were of far greater value. A number of cases showing all possible varieties of these curves are cited and discussed, and many curves are reproduced for the purpose of illustration. Their interpretation often required considerable work and great skill. However, the method as a whole proved of special value in determining the advisability of persisting in conservative treatment as compared to resorting to more radical local surgery, and particularly in determining the site of amputation at which healing might be expected. By this proceeding it was possible at times to save the knee joint whereas otherwise it would have been sacrificed.

The method was found to be entirely harmless as far as the effect of the radioactivity is concerned and, therefore, it may be repeated at reasonable

intervals to follow the progress of the disease or to test the efficacy of therapeutic measures.

T. LEUCUTIA, M.D.

Gluecksmann, A., and Spear, F. G.: The Qualitative and Quantitative Histological Examination of Biopsy Material from Patients Treated by Radiation for Carcinoma of the Cervix Uteri. *Brit. J. Radiol.*, 1945, 18: 313.

Up to the present, radiation therapists have judged tumor response to irradiation on the basis of 5 year survivals and 3 year symptom-free rates. This method is unnecessarily long and Gluecksmann, in 1941, devised a quantitative method of studying tumor response before, during, and after irradiation. In practice, 4 biopsies are taken at weekly intervals. The present series of 166 cases is a follow-up of the original thesis and is compared with a series of 502 cases treated during the period between 1930 and 1939.

Quantitative, histological examinations consist in counting the entire cell population of selected young areas in biopsies taken from the tumor before, during, and after irradiation. Four types of cells are present: dividing, degenerating, resting, and differentiating. By plotting the cell count in percentage against time, the effectiveness of radiation on the tumor may be determined.

Histologically, an unfavorable response to irradiation is characterized by a persistence of mitotic activity and no change in dividing degenerative and differentiating cells. Favorable response to irradiation is characterized by an early disappearance of mitotic and, a little later, of resting cells, with an increase in differentiation and in the degenerate cell count. Later, differentiating cells die and are absorbed, and there is an increase in the degenerate cell count.

Histologically, cells are classified as: anaplastic parakeratotic cells with no signs of differentiation; anaplastic squamous cells with a low degree of differentiation; and anaplastic columnar (adenocarcinomatous) types. The anaplastic parakeratotic tumors responded poorly to irradiation as compared to the squamous and adenocarcinomatous types. In addition to the histology, the clinical stage of the disease has a bearing in response to irradiation.

A series of 502 cases treated during the period between 1930 and 1939 was studied. Of this group 395 cases had been given sufficient histological study to enable the authors to compare it with the recent series of 166 cases. Two hundred and seventy-one cases (69%) were classified as parakeratotic, 97 (24.5%) as squamous, 22 (5.5%) as columnar (adenocarcinoma), and 5 (1%) as negative. Clinically, three-fourths of the parakeratotic tumors were in the inoperable group (stages 3 and 4); one-half of the squamous cell tumors were in stages 3 and 4, and there were too few cases (22) belonging to the columnar (adenocarcinoma) type to warrant classification.

A 5 year follow-up study shows that the response to irradiation of anaplastic parakeratotic tumors is less favorable than that of the differentiating tumors. It must be noted that 75 per cent of the anaplastic type of tumors were in clinical stages 3 and 4 and the response would of necessity not be as favorable as in the other group.

Authors are of the opinion that conclusions concerning eventual tumor response can be drawn from histological studies of biopsies before, during, and after irradiation. MAURICE D. SACHS, M.D.

MISCELLANEOUS

CLINICAL ENTITIES—GENERAL PHYSIOLOGICAL CONDITIONS

Curtis, G. M., and Fertman, M. B.: Blood Iodine Studies. *Ann. Surg.*, 1945, 122: 963.

This paper is one of a series of reports on fundamental metabolic studies. The relation of the basal metabolic rate to the blood iodine in a large variety of thyroid diseases was investigated.

The authors conclude that the basal metabolic rate is a more reliable test of thyroid activity than is the estimation of the level of the unfractionated whole blood iodine. However, they state that both determinations, considered together, are superior to either one alone.

Although the basal metabolic rate is elevated in all forms of toxic goiter, it is increased more in exophthalmic goiter than in any other form of goiter with hyperthyroidism, despite a similarity in the extent of increase of the average unfractionated whole blood iodine in all forms of toxic goiter.

DAVID H. LYNN, M.D.

VanOrdstrand, H. S., Hughes, R., DeNardi, J. M., and Carmody, M. G.: Beryllium Poisoning. *J. Am. M. Ass.*, 1945, 129: 1084.

A disease entity, beryllium poisoning, has been encountered in workers in the beryllium industry. In three plants in the Cleveland area 170 workers have been affected by dermatological and/or respiratory tract manifestations of this disease. When the respiratory tract is involved, the disease may progress to a syndrome resembling chemical pneumonitis. This development caused the death of 5 workers.

JOHN J. MALONEY, M.D.

Schafer, P. W.: The Etiology and Treatment of Polycythemia Rubra Vera. *Ann. Surg.*, 1945, 122: 1098.

By means of proprioceptor depressor neurotomy, a form of absolute polycythemia has been produced experimentally in dogs. This form of experimental polycythemia disappeared following extensive paravertebral sympathectomy. Support is thus given to the theory that the normal, and some abnormal, formation of red blood cells by the bone marrow is under the control of the sympathetic nervous system, through its regulation of the caliber of the presinusoidal vessels of the marrow.

The theory is advanced that some cases of polycythemia rubra vera in man are due to constriction of the presinusoidal blood vessels of the bone marrow, and extensive paravertebral sympathectomy is proposed as treatment for this disease. The successful result of treatment of 1 man with polycythemia rubra vera by extensive paravertebral sympathectomy is then reported.

SAMUEL KAHN, M.D.

Tyson, M. C., Vogel, P., and Rosenthal, N.: The Value of Penicillin in the Treatment of Angranulocytosis Caused by Thiouracil. *Blood, J. Hemat.*, 1946, 1: 53.

Since 1943, when Atwood found that thiouracil effectively inhibited the function of the thyroid gland, this drug has come into increasing favor in the clinical treatment of hyperthyroidism. In severe hyperthyroidism, this agent reduces the basal metabolic rate and brings about clinical improvement. Of all the thyroid depressing drugs thus far tested, thiouracil seems to be the least toxic. However, sufficient cases have been reported to demonstrate convincingly that thiouracil may affect the bone marrow in such a manner as to induce a severe or even fatal agranulocytosis. During his preliminary experiments, Atwood noted 1 patient who had been given a relatively large dose of thiouracil and developed agranulocytosis. This complication has been observed with varying frequency in later series of cases.

The present authors believe that the use of thiouracil is more dangerous than a survey of the literature would indicate; of 54 cases treated with the drug at Mount Sinai Hospital, New York, 6 (approximately 11 per cent) developed agranulocytosis. Three additional cases of postthiouracil agranulocytosis came under the care of the authors. In spite of treatment, 4 of the 9 cases studied were fatal; 5 patients recovered after penicillin therapy. Since penicillin has no deleterious effect on the bone marrow, the authors believe that it is ideal for all cases of agranulocytosis, and especially for those that may have resulted from chemotherapy with thiouracil, sulfonamide, aminopyrine, or other drugs.

This article calls attention to a number of important concepts that may be summarized as follows:

1. The cases that developed agranulocytosis had received thiouracil for at least 5 to 6 weeks before symptoms of the complication appeared.

2. In the treatment of agranulocytosis, penicillin is apparently effective in so far as it combats the bacterial invasion and toxemia, and enables the patient to survive until the bone marrow has regenerated.

3. In attempting to explain why some patients develop sensitivity to the drug and others do not, it is suggested that the cumulative effect of the drug may cause sensitivity and subsequent toxic action on the myeloid elements of the bone marrow.

4. "While there is no question that under certain conditions thiouracil is an excellent drug to tide a patient over an acute episode of thyrotoxicosis, and especially in preparation for thyroidectomy, its effectiveness is present only during its administration. It cannot be considered as a medical cure, since it does not affect the basic difficulty of thyrotoxicosis."

5. "One can predict that in the future there will be an increasing number of cases of agranulocytosis, since additional courses of the drug will be given as recurrence takes place and there will thus be an opportunity for more patients to be sensitized to the drug. For this reason it would seem advisable at present to limit the use of the drug only to selected preoperative cases and those in which operation is contraindicated." DAVID H. LYNN, M.D.

Kline, B. E., Miller, J. A., Rusch, H P., and Baumann, C. A.: The Carcinogenicity of p-Dimethylaminoazobenzene in Diets Containing the Fatty Acids of Hydrogenated Coconut Oil or of Corn Oil. *Cancer Res.*, 1946, 6: 1.

Ten groups of rats each were fed various lipids in synthetic diets containing 0.06 per cent of p-dimethylaminoazobenzene for 4 months, and these diets were then followed by a dye-free diet for 2 more months.

When 2.4 per cent of lauric acid or 4.7 per cent of the fatty acids of hydrogenated coconut oil were fed, no liver tumors developed within 6 months. If, however, these lipids were replaced by 5 per cent of corn oil, or by 4.8 per cent of the fatty acids of corn oil, the tumor incidence at 6 months was 80 and 53 per cent respectively.

The presence of 5 per cent of olive oil or 4.5 per cent of oleic acid in the diet resulted in a tumor incidence of from 33 to 53 per cent, and 87 per cent, respectively, at 6 months. Twenty per cent of the rats fed on a diet free of added fats developed hepatomas within this time. SAMUEL KAHN, M.D.

Sugarbaker, E. D.: The Surgical Problem of Cancer in the Lymph Nodes. *Surgery*, 1945, 18: 608.

This article deals with the problem of the treatment of cancer in the lymph nodes in an attempt to determine how such treatment may be developed to maximum advantage. Considerable divergence of opinion prevails concerning the ideal plan of treatment of occult cancer in the lymph nodes. Therapeutic dissection conveys the idea that the size and character of the nodes indicates lymph node involvement. Prophylactic dissection implies that the nodes are suspected of containing carcinoma cells despite the absence of physical signs of node involvement. It is apparent that in both instances errors in diagnosis will occur. There is a wide variation in the frequency with which different tumors metastasize to the lymph nodes. Different sites of primary involvement and quantitative differences in the lymphatic systems of the parts, the size of the lesion, whether the tumor is primary or recurrent, the nature of previous treatment, and the duration of symptoms must all be taken into consideration. The node incidence in some of the commoner tumors is given in Table 1.

TABLE I. THE NODE INCIDENCE OF CANCER

Tumor	Per Cent
Carcinoma, intrinsic larynx	10
Carcinoma, skin	12 to 15
Carcinoma, penis	25
Carcinoma, lip	31
Carcinoma, lower gingiva	35
Carcinoma, buccal mucosa	40
Carcinoma, vulva	46
Carcinoma, tongue and floor of mouth	63
Melanoma, skin	64
Carcinoma, rectum	68
Carcinoma, colon	70
Carcinoma, extrinsic larynx	70
Carcinoma, stomach	75
Carcinoma, breast	75
Carcinoma, tonsil	77
Carcinoma, nasopharynx	80

Another consideration not discussed in the literature but which seems to be pertinent to the problem relates to quantitative node involvement in dissection specimens from the various tumors and the relative frequency with which widespread metastases occur. A table showing the average number of nodes involved for different types of cases and the percentage of cases with more than one node involved is presented in the original article. It seems reasonable that if a given tumor metastasizes with regularity to only one or two nodes, remains confined there after all clinical doubt as to its presence has been dispelled, and very rarely kills by reason of more widespread dissemination, then such a tumor might as well be treated by a dissection done therapeutically instead of prophylactically. Conversely, when a tumor metastasizes regularly to the local nodes before its presence becomes clinically apparent, is found to involve numerous nodes of the specimens examined, and not infrequently brings about death by distant spread, dissection must be carried out prophylactically if it is to be of any use at all. Therefore, it is apparent that the problem is concerned not only with how frequently regional nodes are involved but also with how rapidly the disease is apt to spread beyond the limits of the removable chain.

In many instances the anatomy is so adaptable that removal of the primary tumor with the regional nodes becomes little more of a task than removal of the primary tumor alone. This is true of the stomach, bowel, and lungs. The question of node dissection, therefore, pertains mainly to those tumors in which the primary and node area are best treated separately, either at one sitting or in stages. Consideration must be given to the relative value of the several major dissections—cervical, axillary, and inguinal—based on the anatomy peculiar to each and the way they lend themselves to node dissection. One must also consider the added risk of prophylactic node dissection in poor risk patients in the cancer age group.

In the surgery of cancer there are, in general, two major problems: (1) the degree of radicality required by the tumor, and (2) the degree of radicality which the patient will withstand. Overestimation of the first and underestimation of the second will result in too high a percentage of postoperative fatalities.

The converse will result in too low a percentage of cured cases. Contraindications to therapeutic and prophylactic node dissection are presented, as well as the arguments for and against prophylactic dissection in cancer of the lip.

JOHN L. LINDQUIST, M.D.

GENERAL BACTERIAL, PROTOZOAN, AND PARASITIC INFECTIONS

Epidemiology Unit Number 22: Sulfadiazine Prophylaxis and Resistant Streptococci. *J. Am. M. Ass.*, 1945, 129: 921.

A previous article has described the pronounced reduction of streptococcic disease which occurred at a large naval training center in the Northwest as the result of sulfadiazine prophylaxis. The present report deals with the loss of effectiveness of this prophylaxis due to the appearance of sulfadiazine resistant strains.

After approximately 3 months of successful sulfadiazine prophylaxis of respiratory infections at a large naval training center, the effectiveness of this measure became progressively less and eventually a major epidemic of streptococcic disease occurred.

An increase in dosage to as high as 2 gm. daily did not prevent streptococcic diseases, and it was the impression of medical officers at the center that the drug had lost its value therapeutically in these infections.

The loss of prophylactic value of sulfadiazine was originally associated with an absolute and relative increase in the frequency of group A, type 19 infections to the practical exclusion of all other types. Later, group A, type 17 became relatively frequent. These two types were shown by laboratory methods to be sulfonamide resistant in vitro.

Other types of streptococci, with a few exceptions of type 3, were not sulfonamide resistant.

The proportion of sulfadiazine resistant strains was greater in those recruit camps getting sulfadiazine prophylaxis than in those not getting sulfadiazine.

There was some suggestive evidence but no definite proof that in the presence of sulfadiazine resistant strains, sulfadiazine prophylaxis tended to increase the streptococcic infections, particularly scarlet fever.

JOHN E. KIRKPATRICK, M.D.

DUCTLESS GLANDS

Shipley, E. G., and Rannefeld, A. N.: Glucose Tolerance in Rats following Repeated Small Doses of Alloxan. *Endocrinology*, 1945, 37: 313.

This article deals with purely laboratory research of glucose tolerance after repeated small doses of alloxan. It has been shown conclusively that a single injection of a large dose of alloxan (from 200 to 400 mgm./kgm.) administered subcutaneously produced severe and permanent diabetes in rats with necrosis of the beta cells in the pancreatic islets (Dunn, Sheehan and McLetchie, 1943; Goldner and Gomori, 1943). Single intravenous injections of from 60 to 75 mgm.–kgm. produced equally severe diabetes in rats (Shipley and Meyer, unpublished data).

The effect of small repeated doses of alloxan on the functional capacity of the islet tissue is not so certain. The authors quote the literature on this particular phase of this research problem and then give their procedure of injecting small doses of alloxan in definite control groups of rats. They then discuss their results and give tables showing the results. They have reached the following conclusions:

Rats given 14 subdiabetogenic doses of alloxan over a period of 4 weeks did not become hyperglycemic on a normal diet, but showed impaired tolerance to administered glucose.

The decrease in tolerance to glucose appeared to be permanent since it remained for 23½ weeks after cessation of the alloxan treatment.

In a second group of rats there was a marked and progressive decrease in glucose tolerance after each injection of a 25 mgm./kgm. dose of alloxan. The decrease in glucose tolerance was shown by the higher blood glucose levels reached early in the tests, and in the slower return of the glucose levels to normal.

It was concluded that 25 mgm./kgm. doses of alloxan given intravenously produced a progressive damage to the pancreatic islets in rats, and that even a small amount of damage was not followed by compensatory reaction.

Extract from the anterior pituitary lobe administered to 4 rats with impaired glucose tolerance produced hyperglycemia after 11 days in 3 of the animals.

PAUL MERRELL, M.D.

Ungar, G.: Endocrine Function of the Spleen and Its Participation in the Pituitary Adrenal Response to Stress. *Endocrinology*, 1945, 37: 329.

The possibility of the spleen's functioning as an endocrine organ has been suspected for a long time. Extensive reviews of the problem by Lauda in 1933 and by Perla and Marmorston in 1935 showed, however, that, in spite of a great deal of circumstantial evidence, there was no valid proof of an internal secretion of the spleen. The last 10 years do not seem to have brought forward any decisive fact, and it may be assumed that the results reported in this article constitute the first experimental evidence that the spleen produces and can release into the circulation a substance acting like a hormone. It is also shown that this function of the spleen is under the control of the pituitary gland and the adrenal cortex. The significance of the internal secretion of the spleen is not yet quite clear but all the data led to the conclusion that it is produced in case of emergency and its main action is on the protein metabolism.

The author describes his method of attacking the research problem and gives the results of endocrine response to tissue injury, hemorrhage, starvation,

and drug actions. The results of these suggested that under the influence of certain stimuli a reaction took place involving the pituitary, the adrenal cortex, and the spleen. The question then was whether the spleen played its part by releasing the active substance or by causing some other reaction. A crude extract of guinea pig spleen in saline solution was prepared and injected subcutaneously in order to study its effect on the bleeding time of guinea pigs. The mode of action of the spleen was studied and found to have the following effects: (1) it reduced the bleeding time; (2) it increased the capillary resistance; and (3) it inhibited the histamine release from the blood cells. The author summarizes his observations and concludes as follows:

In the course of a study of the pituitary-adrenal reaction to stress, this response was found to be inhibited by splenectomy. It was also observed that spleen extracts contain an active substance which can reproduce the reaction to the original stimulus. This active substance was isolated and obtained in pure, crystalline form. It is probably part of the antienzyme system which protects proteins against trypsin. The spleen, as an endocrine organ, may therefore play a part in the control of protein metabolism and its adjustment to conditions of stress.

PAUL MERRELL, M.D.

SURGICAL PATHOLOGY AND DIAGNOSIS

Bowden, R. E. M., and Gutmann, E.: The Clinical Value of Muscle Biopsies. *Lancet*, Lond., 1945, 249: 768.

The authors note that there are several medical and surgical conditions in which examination of biopsy specimens of muscle is helpful or even essential in the establishment of a diagnosis; but until recently this method has been largely neglected in the investigation of neuromuscular disorders. In certain cases of paralysis associated with vascular lesions, the value of muscle biopsies was demonstrated. In peripheral nerve injuries, they have yielded information which has been of great assistance in diagnosis, prognosis, and treatment. In paralysis of gradual onset it may sometimes be difficult to determine whether the lesion is primarily neurogenic or myogenic, and in such cases even electrical reactions and electromyography sometimes do not give decisive information. Besides giving information about the state of the muscle fibers, a muscle biopsy is a form of nerve biopsy, in that nerve fibers, empty Schwann tubes, or motor end plates are almost always found among the muscle fibers.

The authors state that the purpose of this article is to indicate the value of muscle biopsies in the diagnosis, prognosis, and treatment of neuromuscular disorders. Four types of cases have been investigated: (1) lower motor neurone lesions due to peripheral nerve injuries; (2) lower motor neurone lesions other than peripheral nerve injuries, (3) primary muscular disorders, and (4) vascular lesions. Some illustrative cases are described and summaries given of the indications for performing biopsies, the methods of treating specimens, and the findings.

The indications for performing a muscle biopsy may be summarized as follows:

1. To determine the state of muscles in which atrophy is advanced, or in which a vascular lesion is suspected, and, if the latter is found, to assess the type and severity of the lesion. Surgical repair of nerves or long continued physical treatment is valueless if the muscles have been irreparably damaged.

2. To aid in the diagnosis of the type of lesion in the nerve and to determine whether satisfactory regeneration is taking place in partial or recovering lesions.

3. To differentiate between paralysis of myogenic origin and disease of the lower motor neurone.

4. There are special indications for the use of biopsies in certain cases of poliomyelitis as detailed by the authors.

A method of muscle biopsy is presented. The histological findings that are found typical of the types of cases that have been investigated and have been reported herewith are described. In their discussions of the effect of vascular lesions, the authors state that there is still a difference of opinion about the mechanism underlying vascular lesions of muscle, but from experimental and clinical observations it is evident that two main types of lesions must be recognized: (1) those due to interruption of the arterial supply, and (2) those following venous obstruction. A sudden complete obstruction of the artery will cause necrosis of the muscle fibers. If the lesion is the result of venous obstruction, the picture is one of dense fibrous tissue proliferation, but there is no clear cut boundary, and there is extensive infiltration throughout the affected area. Clearly, in either type of lesion there is a poor prospect of recovery if the changes are widespread. Many vascular lesions are complicated by degenerative lesions of the nerve trunks. In such cases, the prognosis is much less favorable.

Finally, the limitations of muscle biopsy are presented. It is noted that a biopsy specimen is a small sample. Furthermore, a biopsy specimen may contain no nerve elements. Sufficient time must elapse for regeneration of nerve fibers if biopsy is to be used to determine whether this process is progressing satisfactorily. When a nerve lesion is at a high level, it may not be justifiable to wait for biopsy before proceeding to direct exploration of the nerve.

HERBERT F. THURSTON, M.D.

EXPERIMENTAL SURGERY

Duguid, J. P.: The Numbers and the Sites of Origin of the Droplets Expelled during Expiratory Activities. *Edinburgh M. J.*, 1945, 52: 385.

The number of droplets expelled during normal breathing, strong nasal expiration, laughing, speaking, coughing, and sneezing has been estimated by four different methods:

1. Counting the colonies on culture plates exposed directly to the droplet spray.

2. Counting the droplet stain marks on slides exposed directly to the droplet spray. This gives the number of all droplets larger than about 20 microns in diameter.

3. Counting the colonies on culture plates exposed in the Bourdillon slit sampler. This gives the numbers of bacteria carrying droplets small enough (with initial diameters under about 100 microns) to remain air borne as droplet nuclei.

4. Counting all microscopically visible droplet nuclei found on oiled slides exposed in the slit sampler, the nuclei being colored by dye previously taken into the mouth. This new method gives the numbers of droplets with initial diameters between about 1 and 100 microns, and these counts are considerably greater than the counts obtained by any other method. The numbers of droplets originating from the nose and throat were estimated in tests with bacillus prodigiosus inoculated as an indicator on to one of the sites.

No droplets were found to be expelled by normal mouth breathing for a 1 minute period. Normal nose breathing for a 5 minute period sometimes did not produce any droplets, and sometimes produced a few; these droplets were found to originate in the nose. A single strong nasal expiration produced from a few to a few hundred droplets; some of these were small enough to form droplet nuclei.

Laughing for a one minute period sometimes did not produce any droplets, and sometimes produced a few; these originated in the faucial region.

Counting softly produced from a few to a few dozen droplets; counting loudly produced from a few dozen to a few hundred; these apparently originated in the front of the mouth and were small enough to form droplet nuclei. Saying 100 "K's" loudly sometimes produced a few dozen or a few hundred droplets; many of these originated in the faucial region, and a few of the faucial droplets were small enough to form droplet nuclei.

A single cough, with the mouth kept well open, sometimes did not produce any droplets, but sometimes produced a few dozen or a few hundred. Many of these originated in the faucial region, and a few were small enough to form droplet nuclei. A single cough, with the mouth initially closed, produced from a few hundred to many thousand droplets; these originated in the front of the mouth and were small enough to form droplet nuclei.

A single natural sneeze produced from a few hundred thousand to a few million droplets; these apparently originated in the front of the mouth, and were small enough to form droplet nuclei. In most sneezes, between a few and a few thousand droplets were found to originate both from the nose and from the faucial region; some of these also were small enough to form droplet nuclei.

Thus, speaking, coughing, and sneezing produce many droplets small enough to remain air borne as droplet nuclei. Nearly all of these small droplets originate in the front of the mouth. The extent of air borne infection, which may be produced by the droplet spray of infected persosn, therefore, must depend largely upon the frequency with which pathogenic organisms are present in the secretions of the anterior mouth. This frequency does not appear to be great. The hazard of air infection with droplets originating in the nose or throat, where pathogenic organisms are often present in great numbers, is limited by the small amount of atomization which is found to take place at these sites.

SAMUEL KAHN, M.D.